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North Carolina Department of Transportation
Division of Highways
Statewide Planning Branch

WAYNE COUNTY THOROUGHFARE PLAN



JANUARY 1995

**THOROUGHFARE PLAN
FOR
WAYNE COUNTY, NORTH CAROLINA**

Prepared by the:

Statewide Planning Branch
Division of Highways
N. C. Department of Transportation

In Cooperation with:

The County of Wayne
The Federal Highway Administration
U. S. Department of Transportation

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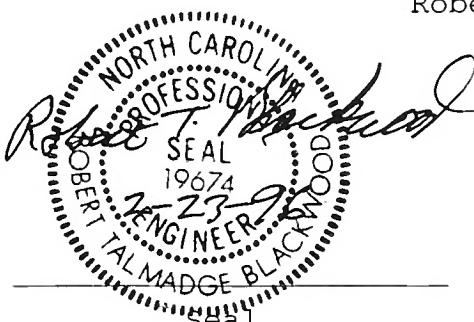
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I. INTRODUCTION

The economic growth of a region can be greatly influenced by how efficiently the transportation system handles travel demands. If the system fails to provide the means for quick and convenient transportation of people and goods, the region's economic growth becomes stagnated and fails to reach its full potential. It is necessary that such a system not only meet existing travel demands, but also that it keep pace with the development of the region. This report will set forth a system of thoroughfares to serve the anticipated traffic and land development needs of Wayne County for the next twenty five years. In the development of the system of thoroughfares, certain priorities shall be established based on maintenance needs, inadequate bridges, poor horizontal and vertical alignment, and insufficient present and future capacity.

The system of thoroughfares proposed was developed following the basic principles of thoroughfare planning as described in Chapter II of this report. Major thoroughfares were located based upon existing and anticipated travel demands, existing streets, existing and anticipated land developments, topographic conditions and field investigations. The plan advocates those improvements which are felt to be essential for proper traffic circulation within the current planning period (1990-2015).

Some of the proposed improvements in the County plan will be primarily the responsibility of the North Carolina Department of Transportation. However, Wayne County can provide assistance in the implementation of the plan through subdivision regulations and zoning ordinances. With the different governmental agencies involved in developing the thoroughfare system, coordination of activities is of prime importance. Thus, it will be desirable for the plan to be formally adopted by both the County Commissioners and the North Carolina Board of Transportation to serve as a mutual official guide in providing a well coordinated, adequate, and economical major street system.

II. COUNTY THOROUGHFARE PLANNING PRINCIPLES

Purpose of Planning

There are many benefits to be gained from thoroughfare planning, but the primary objective is to assure that the road system will be progressively developed in a manner that will adequately serve future travel desires. Thus, the cardinal concept of thoroughfare planning is to make provisions for street and highway improvements so that when needs arise, feasible opportunities to make improvements exist.

Streets, roads, and highways perform two primary functions. They provide traffic service and land service. When combined, these two functions are basically incompatible. This conflict is not serious if both traffic and land service demands are low. When traffic volumes are high, however, access conflicts created by uncontrolled and intensely used abutting property result in intolerable traffic flow friction and congestion.

The major benefits derived from thoroughfare planning are: (1) Each road or highway can be designed to perform a specific function and to provide a specific level of service. This permits savings in right-of-way, construction, and maintenance costs; protects residential neighborhoods, and encourages stability in travel and land use patterns. (2) Local officials are informed of future improvements. Developers can design subdivisions to function in a non-conflicting manner. School and park officials can better locate their facilities. Damage to property values and community appearance that is sometimes associated with road improvements can be minimized.

County Thoroughfare Planning Concept

The underlying concept of the thoroughfare plan is that it provides a functional system of streets, roads and highways which permit travel from origin to destinations with directness, ease, and safety. Different elements in the system are designed and called on to perform specific functions and levels of service, thus minimizing the traffic and land service conflict.

Within the County plan, elements are considered to be either urban or rural. In the urban planning area, the local municipality generally has planning jurisdiction. Outside the urban planning area, the County has planning jurisdiction. In those urban areas where no urban thoroughfare plan has been developed, elements are generally considered to be rural and under the planning jurisdiction of the County. When a thoroughfare plan is developed for an urban area that has not previously had a plan, then the area defined by that plan would be considered urban and come under the jurisdiction of the municipality.

Within the urban and rural systems, thoroughfare plan elements are classified according to the specific function which they are to perform. A discussion of the elements and functions of the two systems follows.

Urban Thoroughfare Classification System

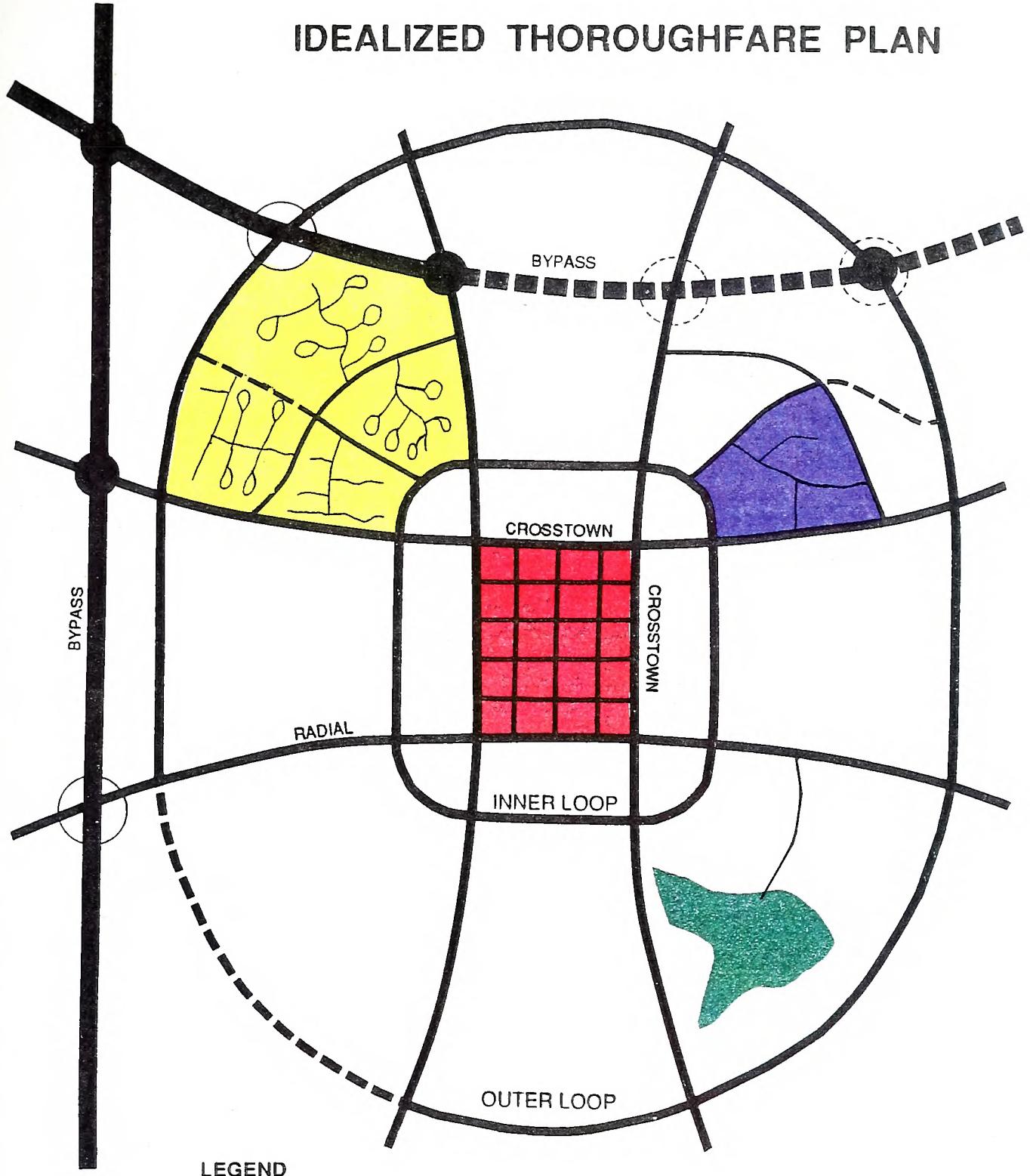
In the urban thoroughfare plan, elements are classified as either local access streets, minor thoroughfares or major thoroughfares. Local access streets which may be further classified as residential, commercial, or industrial streets are designed only to provide access to abutting property. Minor thoroughfares are more important streets in the urban system and are designed to collect traffic from local access streets and carry it to the major thoroughfare system. They may also serve abutting property and serve some minor through traffic movements. The major thoroughfares are the primary traffic arterials of the urban area providing for traffic movements within, around, and through the area.

Due to the limited amount of detail that can be shown on a county thoroughfare plan, only urban major thoroughfares are shown. A coordinated system of major thoroughfares which is most adaptable to desire lines of travel within an urban area and reflected in most urban area thoroughfare plans is the radial-loop system. The radial-loop system includes radials, crosstowns, loops, and bypasses. Radial thoroughfares provide for travel from points outside to major destinations inside the urban area. Crosstown thoroughfares provide for traffic movements across the central area and around the central business area (CBD). Loop thoroughfares provide for lateral travel movements between suburban areas. Bypasses are designed to carry non local traffic around or through the area. Occasionally a bypass with low traffic volumes can be designed to function as a portion of an urban loop. The radial-loop major thoroughfare system concept and concept of functionally classified urban street system are illustrated in Figure 1.

Rural Thoroughfare Classification System

The rural system consists of those facilities outside the urban thoroughfare planning boundaries. They are classified into four major systems: principal arterials, minor arterials, major and minor collector roads, and local roads. Table 1 indicates generally accepted statewide mileage on these systems.

IDEALIZED THOROUGHFARE PLAN



LEGEND

EXISTING PROPOSED

MAJOR THOROUGHFARE
FREEWAY



LAND USES

MAJOR OTHER



COMMERCIAL/BUSINESS

MINOR THOROUGHFARE



RESIDENTIAL

LOCAL ROAD



INDUSTRIAL

INTERCHANGE



PUBLIC/INSTITUTIONAL

GRADE SEPARATION



FIGURE 1

Table 1

<u>System</u>	<u>Percentage of Total Rural Miles</u>
Principal arterial system	2-4
Principal arterial system plus minor arterial road system	6-12
Collector (Major plus minor) road system	20-25
Local road system	65-75

Figure 2 gives a schematic illustration of a functionally classified rural highway system.

Rural Principal Arterial System: The rural principal arterial system consists of a connected network of continuous routes which serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel. The principal arterial system should serve all urban areas of over 50,000 population and a large majority of those with a population greater than 5000. The Interstate System constitutes a significant portion of the principal arterial system.

Rural Minor Arterial System: The minor arterial system in conjunction with the principal arterial system forms a network which links cities, larger towns, and other major traffic generators such as large resorts. The minor arterial system generally serves interstate and intercounty travel and serves travel corridors with trip lengths and travel densities somewhat less than the principal arterial system.

Rural Collector Road System: The rural collector routes generally serve intercounty travel rather than statewide travel and constitutes those routes on which the predominant travel distances are shorter than on the arterial routes. This system is subclassified into major collector roads and minor collector roads.

Major Collector Roads: These routes (1) provide service to the larger towns not directly served by the higher systems and to other traffic generators of equivalent intracounty importance, such as consolidated schools, shipping points, county parks, important mining and agricultural areas, etc., (2) link these places with nearby larger towns or cities, or with routes of higher classification; and (3) serve the more important intracounty travel corridors.

Minor Collector Roads: These routes (1) collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road; (2) provide service to the remaining smaller communities; and (3) link the locally important traffic generators with their rural hinterland.

Rural Local Road System: The local roads comprise all roads not on one of the higher systems. Local residential subdivision streets and residential collector streets are elements of the local road system. Local residential streets are either cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares or serve major traffic generators and do not collect traffic from more than one hundred dwelling units. Residential collector streets are streets which serve as the connecting street system between local residential streets and the thoroughfare system.

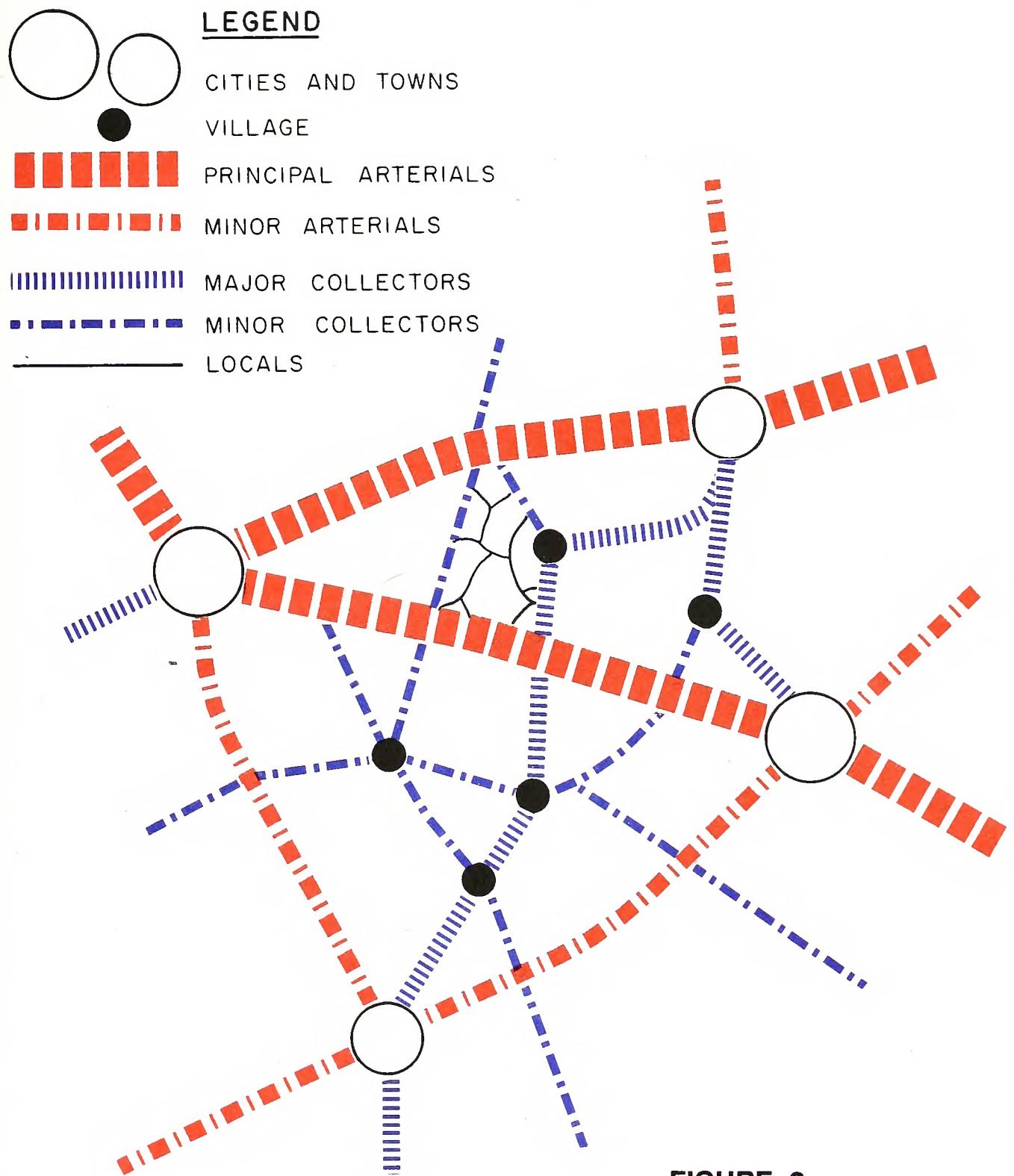


FIGURE 2

SCHEMATIC ILLUSTRATION
OF FUNCTIONALLY CLASSIFIED
RURAL HIGHWAY NETWORK



III. URBAN THOROUGHFARE PLANS IN WAYNE COUNTY

Thoroughfare planning is the process used by public officials to assure the development of the most logical and appropriate street system to meet the existing and future travel desires within the urban area. It is essential that the municipalities and the County cooperate in developing a system for safe and efficient travel within and beyond the County.

Recognizing the importance of such a system, the Goldsboro urban area has planned transportation improvements for many years. In 1961 the consulting firm of Harland Bartholomew and Associates was hired to develop a master Thoroughfare Plan for the area. In 1976 a study by the North Carolina Department of Transportation resulted in a thoroughfare plan mutually adopted by the City of Goldsboro and the North Carolina Board of Transportation. Accomplishments from this plan include: relocation of Elm Street from US 117 to the Railroad tracks, construction of Stony Creek Parkway from Elm Street to Harris Street, and the widening of Wayne Memorial Drive to five lanes north of the Bypass.

The 1976 Plan was reevaluated in 1987 and mutually adopted once again by the City of Goldsboro and the North Carolina Board of Transportation. Accomplishments from this plan include: widening and relocation of US 117. Construction has begun on the Southern Connector and the Spence Avenue/Best Road and US 70 interchange.

The 1987 Plan was reevaluated in 1992. The planning area was expanded this time to include the Village of Walnut Creek. The adoption process is underway for that Plan. The Thoroughfare Plan Report establishes a priority listing for highway projects in the Goldsboro planning area. A priority list helps determine the construction schedules. Projects that are chosen to be constructed are published as the Transportation Improvement Program (TIP). A priority list does not dictate that a certain project be constructed before another, or at a specific time, but is just a generalized rating of each project based on traffic at a specific point in time. This list should remain flexible and be updated regularly as traffic demands change in the future. The scheduled projects on the 1996-2002 Transportation Improvement Program for the Goldsboro area include:

1. US 70 Goldsboro Bypass
2. US 117 relocation (US 70 to US 264 in Wilson)
3. Southern Loop (SR 1915 to SR 1960)
4. Spence Avenue Interchange
5. NC 111 (Widen to 5 lanes from US 70 to S. Loop)

For more details concerning the Goldsboro Urban Area Thoroughfare Plan you may obtain a report from the Statewide Planning Branch or the City of Goldsboro.

The Town of Mount Olive in Southern Wayne County has also been involved with thoroughfare planning since they adopted their first Plan in 1981. The major construction item in that plan was the realignment of Smith Chapel Road (SR 1157) to tie in with Smith Chapel Highway (SR 1147) at US 117 Bypass.

Interest in constructing parts of the 1981 Plan and other new congestion problems prompted the Mount Olive Town Council to ask for an update. A new Plan was mutually adopted by the Town and the North Carolina Board of Transportation in 1994. A report detailing that Plan is available from the Statewide Planning Branch or the Town of Mount Olive.

IV. WAYNE COUNTY-POPULATION, EMPLOYMENT, LAND USE, AND TRAFFIC

Wayne County, named for General Anthony Wayne, a revolutionary leader, is located in the Central Coastal Plain Region in North Carolina. As shown in Figure 3, the County is bordered to the North by Wilson County, to the East by Lenoir and Greene Counties, to the South by Sampson and Duplin Counties, and to the West by Johnston County. Manufacturing, including production of food products, apparel, textile mill products, household furniture and electronic equipment are major contributors to the livelihood of Wayne County. Wayne County is also one of the leading counties in the State for production of: livestock, dairy products, poultry, wheat, soybeans, oats, and sweet potatoes. Travel distances from the County to major cultural, educational and industrial centers are relatively short. The Capital City of Raleigh is approximately fifty miles from the center of the County, and the Research Triangle Park and Durham lie respectively, 64 and 74 miles to the Northwest.

Major highways in Wayne County are US 13, US 70, US 117, NC 55, NC 111, NC 222, and NC 581. There are two rail systems in Wayne County that are presently owned and operated by the CSX Corporation and Norfolk and Southern Railroad. Both provide freight service within the County with cargo consisting of coal, grain, and building supplies.

Major commercial air service for the County is presently provided by nearby Raleigh-Durham International Airport, which is predicted to remain unchanged during the planning period (1990-2015). Of significance to private aviation and business flying are the Goldsboro-Wayne County Airport and the Mt. Olive Municipal Airport. The Goldsboro-Wayne County Airport, constructed in 1968, is located six miles north of Goldsboro and one mile east of US 117. Future improvements to this airport include expansion and rehabilitation of the apron, and new glide slope equipment. These improvements are scheduled in the Transportation Improvement Program (TIP) in 1995-1998. The Mount Olive Municipal Airport is located in the southern portion of Wayne County and is scheduled for improvements in the TIP in 1996, 97, and 98, which include lengthening the runway and adding visual approach aids. Another point of interest in Wayne County's air service is Seymour Johnson Air Force Base which was reactivated in 1956. It is located immediately south of Goldsboro, covering over 50,000 acres. Today, it employs approximately 5500 personnel, which will remain relatively constant in the future.

Wayne County covers 554 square miles with Goldsboro, the county seat, at an elevation of 111 feet. The topography consists mainly of gently sloping hills and nearly level land, with some steep uplands. Wayne County is naturally drained by the Neuse River, which flows in a southeasterly direction through the central and southern portion of the County, and by many various creeks.

The planning area has a variety of wildlife and natural vegetation species. A survey done as part of the Natural Heritage

Program of the Division of Parks and Recreation found several plants and animal species that were endangered or threatened within the confines of the planning area.

WAYNE COUNTY GEOGRAPHIC LOCATION

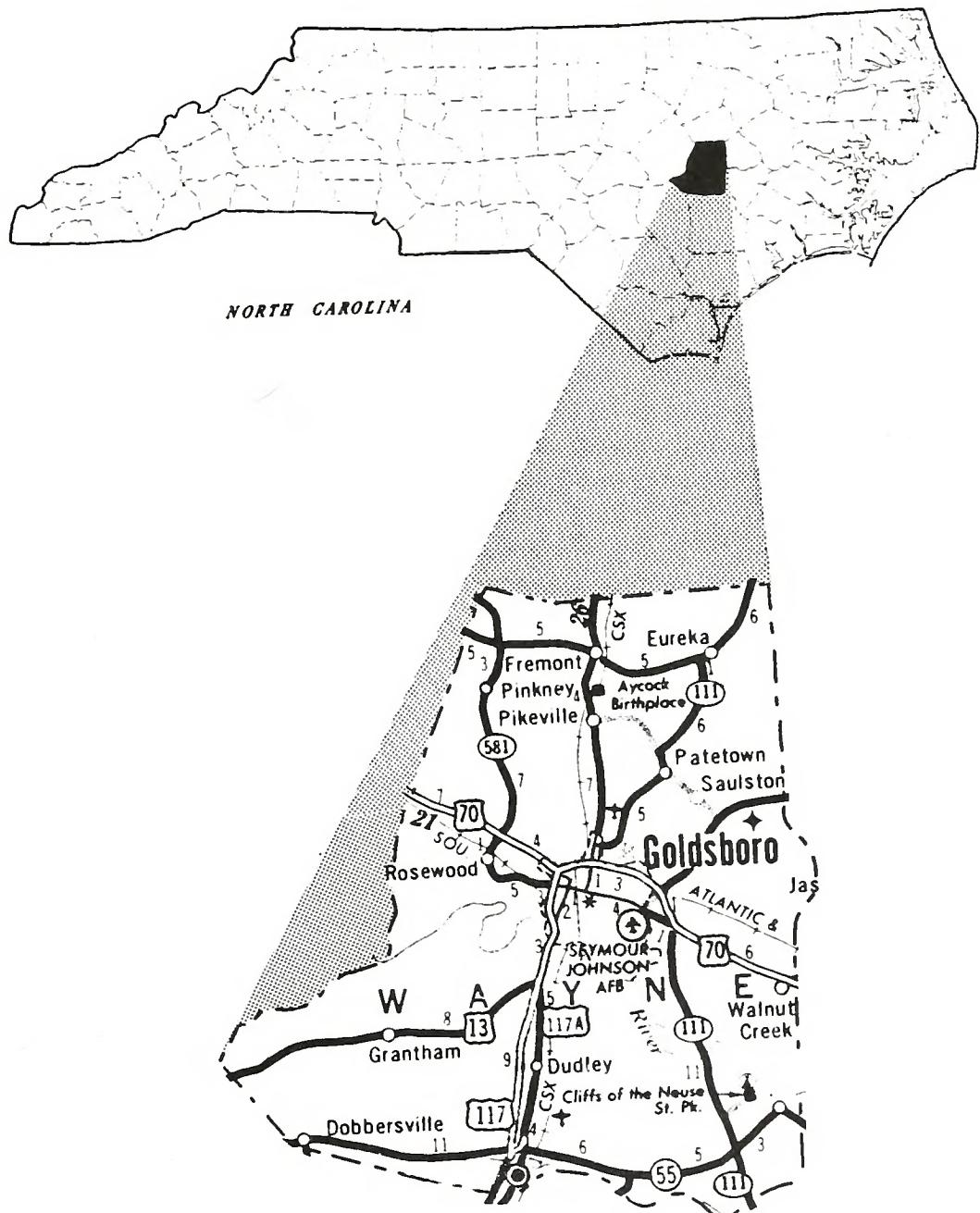
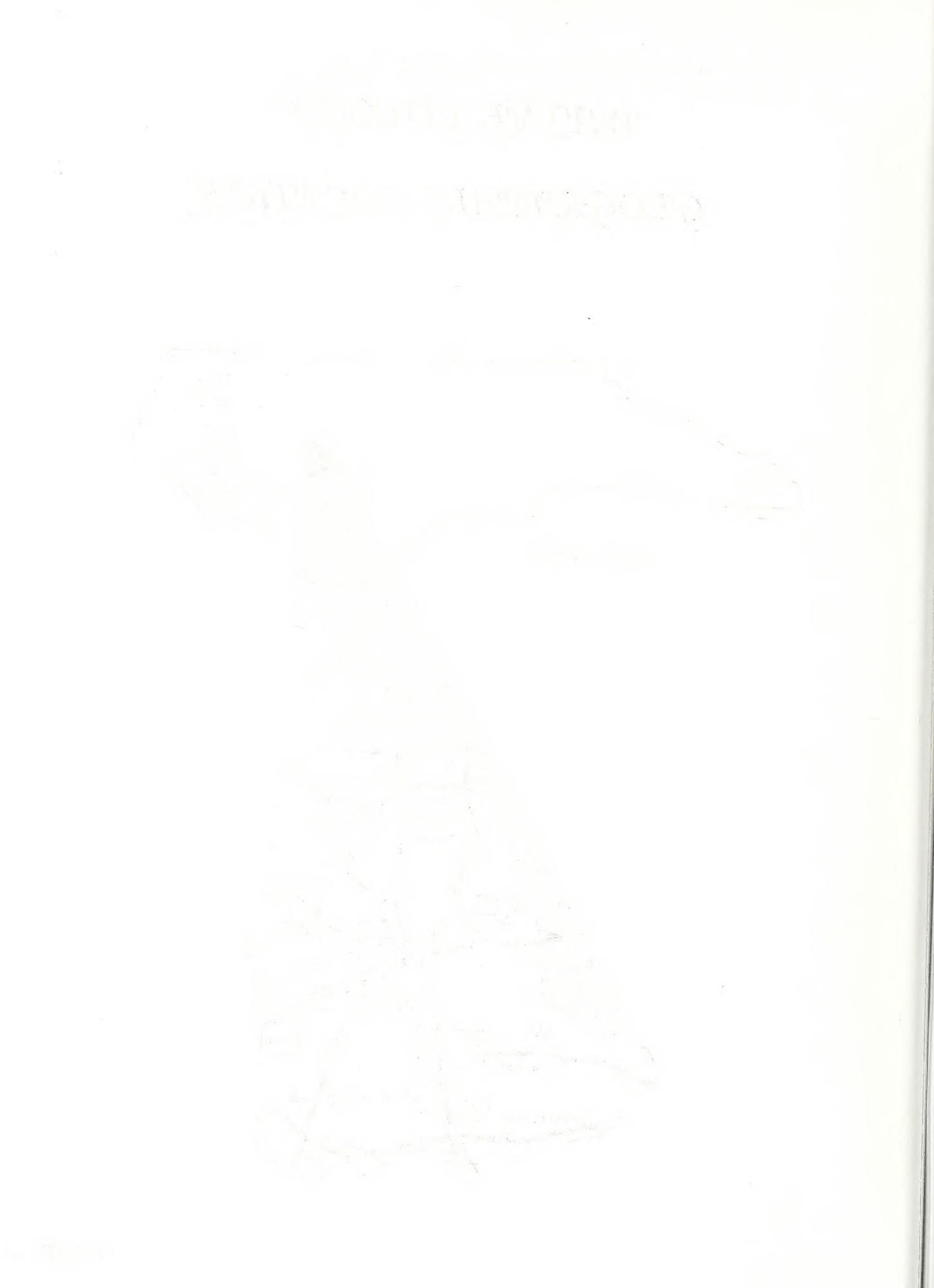


FIGURE 3



Factors Affecting Transportation

The objective of thoroughfare planning is to develop a transportation system which will enable people and goods to travel safely and economically. To determine the needs of a county, factors of population, land use, and traffic must be examined. To properly plan for the transportation needs, it is important to understand and describe the type and amount of travel which takes place in that area, and also to clearly identify the goals and objectives to be met by the thoroughfare plan.

In order to fulfill the objectives of an adequate 25-year thoroughfare plan, reliable forecasts of future travel characteristics must be achieved. Such forecasts are possible only when the following major items are carefully analyzed: (1) historic and potential population changes; (2) significant trends in the economy; (3) character and intensity of land development; and (4) motor vehicle registration and usage. Additional items that vary in influence include the effects of legal controls such as zoning ordinances and subdivision regulations, availability of public utilities and transportation facilities, and topographic and other physical features of the urban area.

Population Trends

The volume of traffic on a section of roadway is a function of the size and location of the population it serves. An analysis of population is one of the first steps for transportation planners. The analysis of past trends allows the planner to estimate future population and the traffic that it will generate with some degree of reliability.

Since 1970, the population of Wayne County has grown steadily, but the rate of growth has been decreasing. From 1970 to 1980, there was a significant increase in population of 13.6 percent in Wayne County. This growth was helped by the 18.9 percent population increase in Goldsboro. During the 1980's, the percent change in population of Wayne County decreased to 7.8 percent, and is expected to continue this decline through the year 2015 to 5.5 percent.

Table 2 shows the historical and projected populations for North Carolina, Wayne County and Goldsboro. Goldsboro is Wayne County's most heavily populated community, containing approximately 39 percent of the County's population.

The percent change in population for North Carolina, Wayne County and Goldsboro as shown in Table 3.

TABLE 2

LOCATION	YEAR				
	1970	1980	1990	2000	2015
North Carolina	5,082,059	5,881,766	6,628,637	7,399,717	8,379,26
Wayne County	85,408	97,054	104,666	111,458	117,548
Goldsboro	26,810	31,871	40,709	-	-

Source: North Carolina Office of State Budget and Management

TABLE 3

LOCATION	PERCENT CHANGE IN POPULATION			
	1970-1980	1980-1990	1990-2000	2000-2015
North Carolina	+15.7	+12.7	+11.6	+13.2
Wayne County	+13.6	+1.7	+6.5	+5.5
Goldsboro	+18.9	+27.7	-	-

Source: North Carolina Office of State Budget and Management

Employment

Since 1985, employment trends in Wayne County have remained relatively constant with no major changes from one employment sector to another. The employment sectors and their respective number of employees for 1989 are listed in Table 4. Wholesale and retail trade have dominated the major portion of Wayne County's employment, with the number of government employees rating second. These historical trends are expected to remain constant during the thoroughfare planning period.

TABLE 4

EMPLOYMENT		
Employment Classification	Number of Employees	Percent (%)
Wholesale & Retail Trade	10,264	26.0
Government	9,024	22.9
Manufacturing	9,009	22.8
Services	5,332	13.5
Construction	2,358	6.0
Finance, Ins., & Real Estate	1,372	3.5
Transportation	1,215	3.1
Agricultural	890	2.3

Source: "Employment and Wages in North Carolina", Third Quarter 1989, Employment Security Commission of North Carolina, Labor Market Information Division

Land Use

The generation of traffic on a particular street is very closely related to the utilization of adjacent land areas. Some type of land uses generate much more traffic than others. For example, a commercial or retail area such as a shopping center would generate or attract much larger volumes of traffic than a residential area. The attraction between different land uses varies with the intensity of the development and the distance between those developed areas. It, therefore, becomes necessary to designate land uses by type for the purposes of transportation planning. An analysis of the distribution of existing land uses serve as a basis for forecasting future land use needs and the resulting travel patterns.

Wayne County was established in 1779 and has an area of 354,368 acres. Agriculture development accounts for the majority of the land use in the study area. In 1989, harvested cropland accounted for approximately 36 percent or 127,000 acres of the land in Wayne County. Primary crops include soybeans, wheat, oats, sweet potatoes, and tobacco. In Farm Cash Receipts, Wayne County ranked tenth for all crops produced in North Carolina and fifth for livestock, dairy and poultry. Another significant

portion of the land in Wayne County is covered by commercial forest land. Production in 1984 totaled over 32,000 thousand board feet of pine and hardwood, with three active sawmills. Commercial and industrial developments center around Goldsboro, with smaller concentrations of businesses in Mt. Olive, Elroy, Rosewood, Brogden, Freemont and Pikeville. These historical land use trends in Wayne County are expected to remain relatively constant during the thoroughfare planning period.

There are at least 60 or more sites of historic importance located throughout the County (Figure 4 and Table 5). Several of these sites are already listed in the National Register of Historic Places and others are under consideration for nomination.

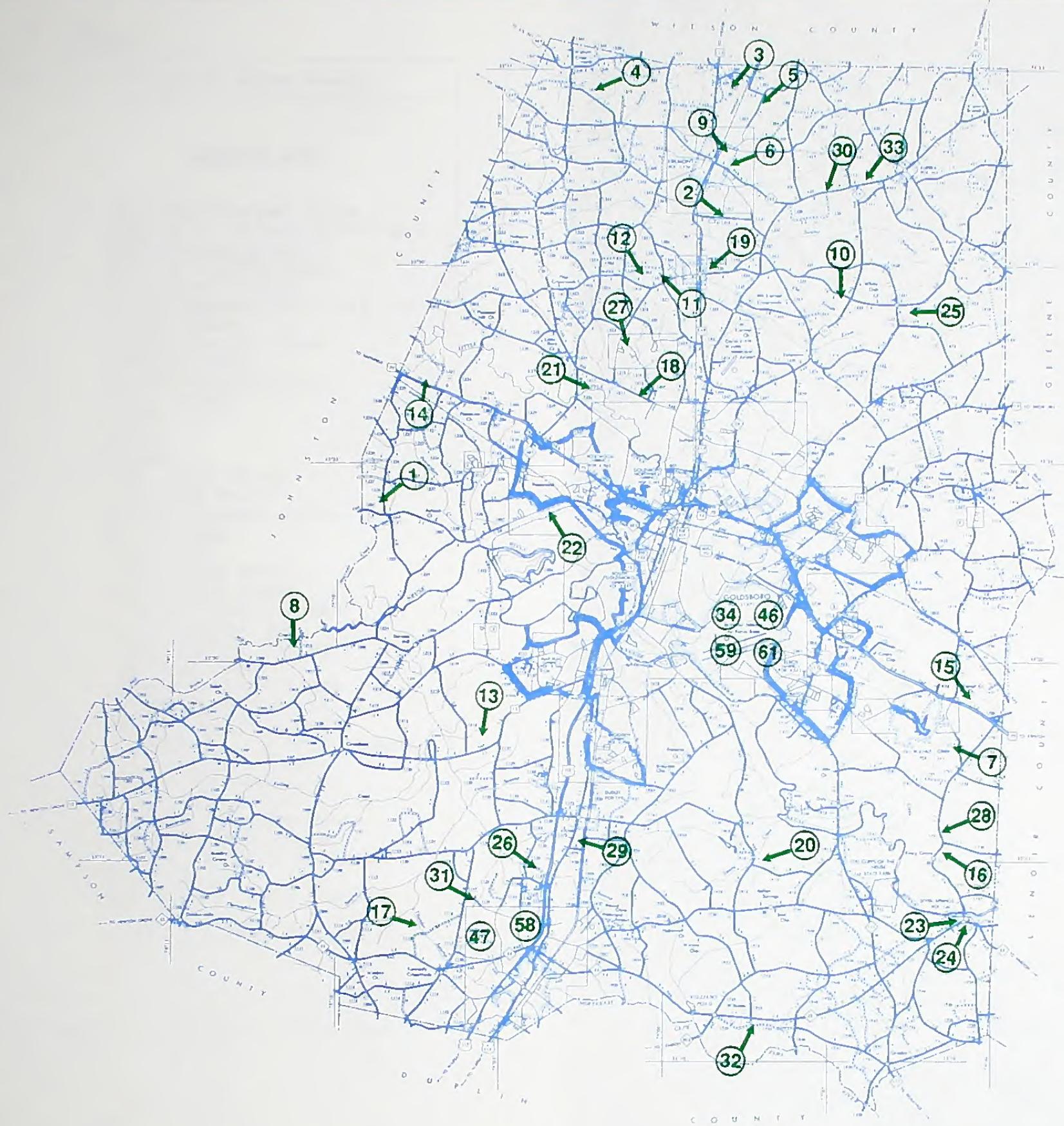
Traffic

A comparison of 1990 and projected 2015 average annual daily traffic volumes (ADT) on selected major roads and highways in Wayne County are shown in Figure 5. The projected ADTs were based on historical and anticipated population and economic growth patterns and land use trends.

Vehicle registration has increased at a much greater rate than population since 1940. The increase can best be shown by a graph depicting the change in persons per vehicle ratio over a period of time. This ratio is obtained by dividing the total population of the area by the total number of vehicles registered in that area. Figure 6 shows this comparison for North Carolina and Wayne County and includes projections to 2015. The results illustrate the transition from a non-automobile oriented society to one whose vitality is heavily dependent on the automobile. This change in life style has gradually occurred over many years, with the most dramatic difference being between 1940 and 1960. This is primarily due to the following reasons:

- 1) The post-depression increase in the standard of living.
- 2) The increase in population including the post World War II "Baby Boom".
- 3) The transition from an agriculturally dominated society to a more diversified one (less people on the farm, but more need for transportation).
- 4) The availability of automobiles in the 1960's and 1970's and the banking credit to buy them (more cars easier credit).

Since the early 1970's however, these reasons for purchasing more automobiles have had less influence and have led to the expectation that the person per vehicle rate will begin to stabilize as projected in Figure 6. This saturation effect is expected to stabilize trip-making characteristics of families in the middle and upper income categories due to the fact they already have the financial means to purchase a sufficient number of vehicles to satisfactorily serve their transportation needs. On the other hand, moderate growth in the trip making characteristics of lower income families is projected due to an expected improvement in their financial well-being.



WAYNE COUNTY NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH

IN COOPERATION WITH

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

FIGURE 4

HISTORICALLY SIGNIFICANT SITES



TABLE 5

Historically Significant Sites in Wayne County

<u>Map Index</u>	<u>Name of Site</u>
1	William Atkinson House
2 *	Charles B. Aycock Birthplace
3	John Barnes House
4	John A. Barnes House
5	Silas Best House
6	Branch Banking and Trust Co.
7	Creech House
8	Joseph Everett House
9	Fremont Depot
10	George Herring House
11	Hooks House
12	House
13	House
14	House
15	Fred Isler House
16	John Ivey House
17	Daniel Kornegay House
18	Orton House
19	Pate House
20	Robert Peel House
21	John Sasser House
22	A Sasser Family House
23	Seven Springs Spa
24	Seven Springs United Methodist Church
25	Calhoun Sherrod House
26	Brantley Smith House
27	Raymond Stafford House
28	Strawberry Hill (Myrtlewood)
29	J. J. Thigpin House
30	Twin Oaks Plantation
31 *	Vernon (Destroyed)
32	Mac Carr Williams House
33	Dred Yelverton House
34	Atlantic & N. C. Railroad Warehouse
35 *	Christian Science Society Church
36	Isaac F. Dortch Law Office

* Sites listed in the National Register of Historic Places

TABLE 5 (Continued)

<u>Historically Significant Sites in Wayne County</u>	
<u>Map Index</u>	<u>Name of Site</u>
37	Judge Wm. T. Faircloth Law Office
38	Goldsboro City Hall
39 *	Goldsboro Union Station
40	Paramount Theatre
41	St. Stephens Episcopal Church
42	Seaboard-Goldsboro Freight Station
43	Wayne County Courthouse
44 *	Henry Weil House
45 *	Solomon Weil House
46	Wilmington and Weldon Railroad Warehouse
47	David J. Aaron House
48	John Bell House
49	"The Elms"
50	Farrior-Wooten House
51	Elizabeth Flowers House
52	Cullen Hatch House
53	Fred Martin House
54	Mt. Olive Freight Station
56	The Oaks
57	Shine-Southerland House
58	Col. Robert Southerland, Sr., House
59 *	Giddens Jewelry Store and Street Clock
60	Herman Park
61	Temple Oheb Salom

* Sites listed in the National Register of Historic Places

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WAYNE COUNTY NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH

IN COOPERATION WITH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

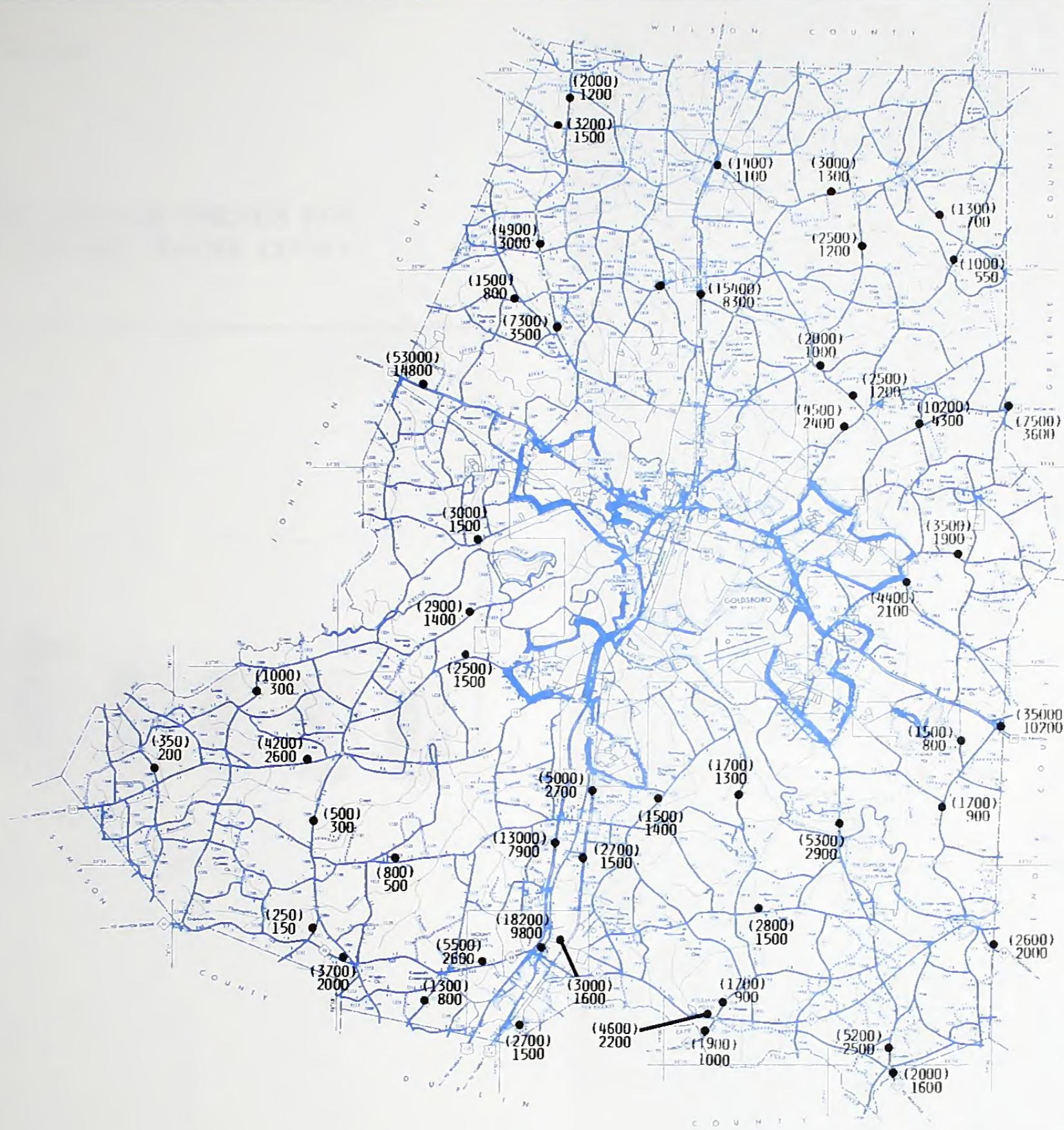


FIGURE 5
ADT VOLUMES

LEGEND

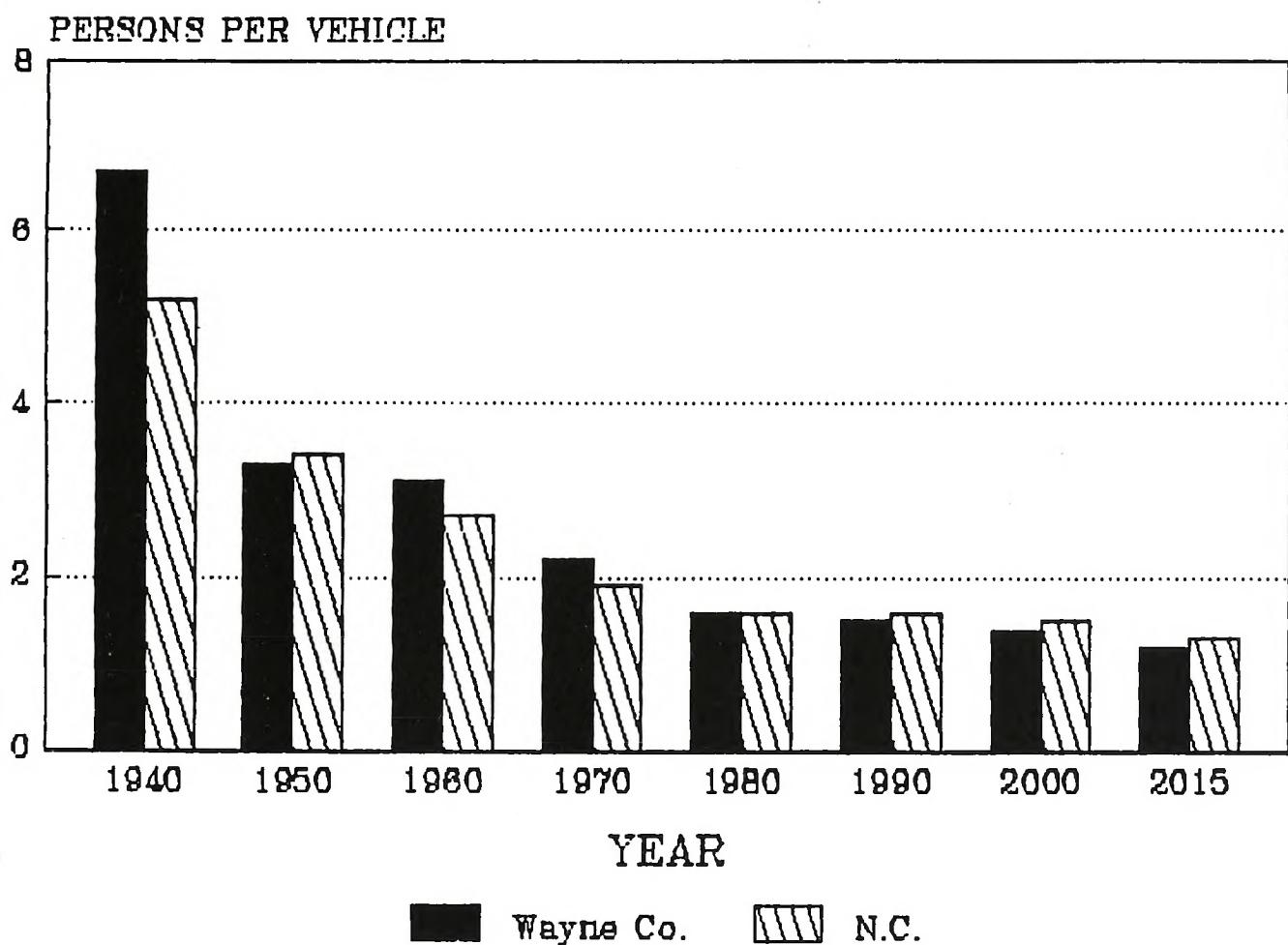
YEAR	ADT VOLUMES
2015	(0000)
1990	0000

SCALE



FIGURE 6

PERSONS PER VEHICLE TRENDS FOR
NORTH CAROLINA AND WAYNE COUNTY





Capacity, Width, and Alignment Deficiencies

North Carolina's standard for highway construction calls for 11 foot lanes on all highways with traffic volumes greater than 2000 ADT (average daily traffic) or design speeds greater than 50 miles per hour, including all primary arterials. A minimum lane width of 9 feet can be tolerated on collector roads with an ADT of less than 400 vehicles per day. Minimum level of service for minor collector roads dictate a 40 mph average overall travel speed during peak traffic conditions.

Design requirements for thoroughfares vary according to the desired capacity and level of services to be provided. Universal standards in the design of thoroughfares are not practical. Each road or highway section must be individually analyzed and its design requirements determined on the basis of amount and type of projected traffic, existing capacity, desired level of service, and available right-of-way.

The level of service is a function of the ease of movement experienced by motorists using the facility. The ability of a motorist to drive at a desired speed is dependent upon the physical design of the road, the amount and character of traffic control devices, the influence and character of traffic generated by abutting property, and imposed speed restrictions. The level of service is generally indicated by the overall travel speed experienced by traffic. Recommended minimum levels of service for roads and highways included in the proposed Wayne County Thoroughfare Plan are given in Table 6.

TABLE 6

Minimum Levels of Service For Roads and Highways	
<u>Facility</u>	<u>Overall Travel Speed During Peak Traffic Conditions</u>
Major and Minor Arterials	50-55 MPH
Major Collector Roads	45-50 MPH
Minor Collector Roads	40 MPH

From the standpoint of driver convenience, ease of operations, and safety, it would be desirable to widen all existing roads and highways to provide a minimum lane width of 12 feet. However when considering overall statewide needs and available highway revenues, it is found that these levels of improvement applied statewide would be impractical. It is necessary, therefore, to establish minimum tolerable widths for existing roads with respect to traffic demands which would be economically feasible. Table 7 gives the widths used in determining the existing lane deficiencies in the County.

TABLE 7

Minimum Tolerable Lane Widths (in feet)			
<u>ADT</u>	<u>Principal Arterials</u>	<u>Minor Arterials</u>	<u>Collectors</u>
Over 2000	11	11	11
400-2000	-	10	10
100- 400	-	10	9
Below 100	-	-	9

An analysis of highways in Wayne County was made to determine if the projected traffic (year 2015) would exceed the practical capacity of the system. The projected volumes are shown in Figure 5.

Comparing the projected traffic to available capacities, it was anticipated that the following roads will be experiencing capacity related problems within the design period:

1. US 70
2. US 117 North (Existing)

There are a number of roads in the County that have substandard widths. Standards established in Table 7 were used in the analysis. The width needed to bring these roads up to standard are given as the recommended cross section in Appendix A. Because of the substantial cost of upgrading all secondary roads to standard, narrow widths may have to be tolerated until sufficient funds are available to provide for improvements.

Traffic Safety

Traffic accidents are of assistance in locating problem areas on the highway system. The 1991 safety program listing, obtained from the Traffic Engineering Branch of North Carolina Department of Transportation, is a tabulation of accident locations throughout the state.

Traffic accident data for the period from January, 1988 through June, 1991 was analyzed as part of the development of the thoroughfare plan. Listed in Table 8 are the locations which have 10 or more accidents within 200 feet of the intersection.

Certain prevailing conditions were considered in the accident analysis. These conditions are: intersection geometrics, sight distance, signalization, road conditions, weather, light conditions, driver's condition and accident type. While no accidents are desired, a certain number are apparently unavoidable due to certain conditions.

Geometrics, sight distance and signalization are among the recommendations for the following intersections:

- * NC 55 - Breazeale
- * US 117 - SR 1120
- * Breazeale - Main
- * Breazeale - James
- * NC 55 - NC 111
- * Center - James
- * SR 1120 - SR 1932

Certain intersections warrant further analysis, which is beyond the scope of this study. These intersections include:

- * US 70 - SR 1711
- * US 70 - SR 1719
- * US 70 - SR 1731

According to "North Carolina Traffic Accident Facts", 1990 edition, Wayne County had 19.8 motor vehicle accidents per 1000 population in 1990 as compared to 25.0 for the State.

By the same criteria Wayne County was ranked twenty-second out of a total of 100 counties in North Carolina, with a ranking of one awarded to the County with the highest number of motor vehicle accidents.

TABLE 8

Accident Profile of Wayne County	
<u>Location</u>	<u>Number of Accidents</u>
(1) US 70 - SR 1711	24
(2) NC 55 - Breazeale	20
(3) US 117 - SR 1120	17
(4) US 70 - SR 1719	16
(5) Breazeale - Main	15
(6) SR 1003 - SR 1565	14
(7) Breazeale - James	14
(8) NC 55 - NC 111	13
(9) Center - James	11
(10) SR 1120 - SR 1932	10
(11) US 117 - SR 1147	10
(12) US 70 - SR 1731	10

Bridge Conditions

Bridges are a vital and unique element of a highway system. First they represent the highest unit investment of all elements on the system. Second, any inadequacy or deficiency in a bridge reduces the value of the total investment. Third, a bridge presents the greatest opportunity of all potential highway failures for disruption of community welfare. Finally, and most importantly, a bridge represents the greatest opportunity of all

highway failures for loss of life. For these reasons, it is imperative that bridges be constructed to the same design standards as the highway system of which they are a part.

Congress enacted the National Bridge Inspection Program Standards on April 27, 1971, implementing the Federal Highway Act of 1968. These standards require that "all structures defined as bridges located on and of the Federal-Aid Highway Systems be inspected and the safe load carrying capacity computed at regular intervals, not to exceed two years." A sufficiency index number has been calculated for each bridge for the purpose of establishing eligibility and priority for replacement. The bridges with the highest priority are replaced as Federal-Aid funds and State funds are made available. Additional funds have recently been provided by Congress specifically for bridge replacement.

The North Carolina DOT's Bridge Maintenance Unit has been assisted by consultants in inspecting all bridges on the State Highway System. All bridges in Wayne County have been analyzed, rated, appraised, and inventoried. The resulting data has been reduced to a more readily useable form as a management tool.

A sufficiency rating was used in the analysis to determine the deficiency of a particular bridge. The sufficiency rating is a method of evaluating factors which are indicative of bridge sufficiency to remain in service. Factors included: structural adequacy and safety, serviceability and functional obsolescence, essentialness for public use, structure type, and traffic safety features. The result of this method is a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent an entirely insufficient or deficient bridge. A sufficiency rating of 50 percent or less qualifies for Federal Bridge Replacement funds.

There are 137 bridges in Wayne County, forty-two of them have sufficiency ratings of 50 percent or less, which makes them eligible for federal bridge replacement funds. Table 9 shows structurally deficient bridges with sufficiency ratings of less than 50 percent (Refer to Figure 7 for the map location of these bridges). Table 10 lists functionally obsolete bridges with sufficiency ratings lower than 50 percent. Their locations are shown in Figure 8. These bridges are listed as functionally obsolete bridges in Wayne County by the NCDOT Bridge Department. They are also eligible for Federal Bridge Replacement Funds.

Below are four bridges listed in the current Transportation Improvement Program. The last bridge replacement is scheduled for construction in 2001.

* Bridge Replacement Program - Wayne County (Bridge Numbers)

- SR 1212 over Mill Creek (77)
- SR 1920 over Stoney Creek (298)
- NC 55 over Lewis Creek (41)
- NC 111 at pond (54)
- NC 111 at Nahunta Swamp (34)
- US 117A at Brooks Swamp (16)

- SR 1007 over Beaver Dam Creek (67)
- SR 1008 over Buck Swamp (129)
- SR 1560 over Stony Creek (8)
- SR 1948 over Cape Fear River (256)

TABLE 9

Structurally Deficient Bridges in Wayne County			
<u>Map Index</u>	<u>Sufficiency Rating %</u>	<u>Bridge No.</u>	<u>Location</u>
1 *	11.0	256	SR 1948 @ NE Cape Fear River
2 *	11.5	54	NC 111 @ Pond
3 *	11.8	41	NC 55 @ Lewis Creek
4	12.1	37	SR 1537 @ Nahunta Swamp
5 *	12.3	19	US 13 @ Thoroughfare Swamp
6	12.3	41	NC 111 @ Neuse River Overflow
7 *	13.5	65	SR 1224 @ Neuse River
8 *	18.6	77	SR 1212 @ Mill Creek
9	25.1	229	NC 111 @ The Slough
10	27.4	10	SR 1705 @ West Bear Creek
11	27.6	131	SR 1130 @ Yellow Swamp
12 *	28.0	16	US 117 @ Brooks Swamp
13	29.5	122	SR 1714 @ Br. of Bear Creek
14	29.9	120	SR 1728 @ Walnut Creek
15	31.5	235	SR 1571 @ Stoney Creek
16	31.9	15	SR 1719 @ Bear Creek
17	32.0	88	SR 1006 @ Falling Creek
18	33.4	24	NC 403 @ NE Cape Fear River
19 *	33.6	8	SR 1560 @ Stoney Creek
20 *	33.9	67	SR 1007 @ Beaver Dam Creek
21	34.0	215	SR 1227 @ Beaver Dam Creek
22	36.3	40	SR 1513 @ Creek
23	37.2	20	US 70 Bus. @ SCL Railroad
24	37.8	264	SR 1117 @ Thunder Swamp
25	39.9	45	SR 1353 @ Great Swamp
26	40.0	197	SR 1340 @ Creek
27	40.2	218	SR 1505 @ Turner Swamp
28 *	42.1	129	SR 1008 @ Buck Swamp
29	44.0	69	US 13 & US 117 @ US 70 Bus.
30	44.1	35	SR 1532 @ Exum Mill Branch
31	44.4	156	SR 1101 @ Beaver Dam Creek
32	44.5	96	SR 1006 @ Thoroughfare Swamp
33	46.5	25	SR 1575 @ Exum Mill Creek
34	48.0	74	SR 1217 @ Creek
35	48.7	92	SR 1102 @ Creek

* Included in current Transportation Improvement Program

TABLE 10

Functionally Obsolete Bridges in Wayne County

<u>Map Index</u>	<u>Sufficiency Rating %</u>	<u>Bridge No.</u>	<u>Location</u>
1	29.6	62	NC 581 @ Little River
2 *	34.5	298	SR 1920 @ Stoney Creek
3	40.1	222	SR 1500 @ Creek
4	42.6	75	US 13 Bypass @ SCLRR
5	44.0	103	SR 1118 @ Thunder Swamp
6	44.1	296	SR 1222 @ Neuse River Overflow
7	48.7	164	SR 1571 @ Stoney Creek

* Included in current Transportation Improvement Program



WAYNE COUNTY NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH
IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

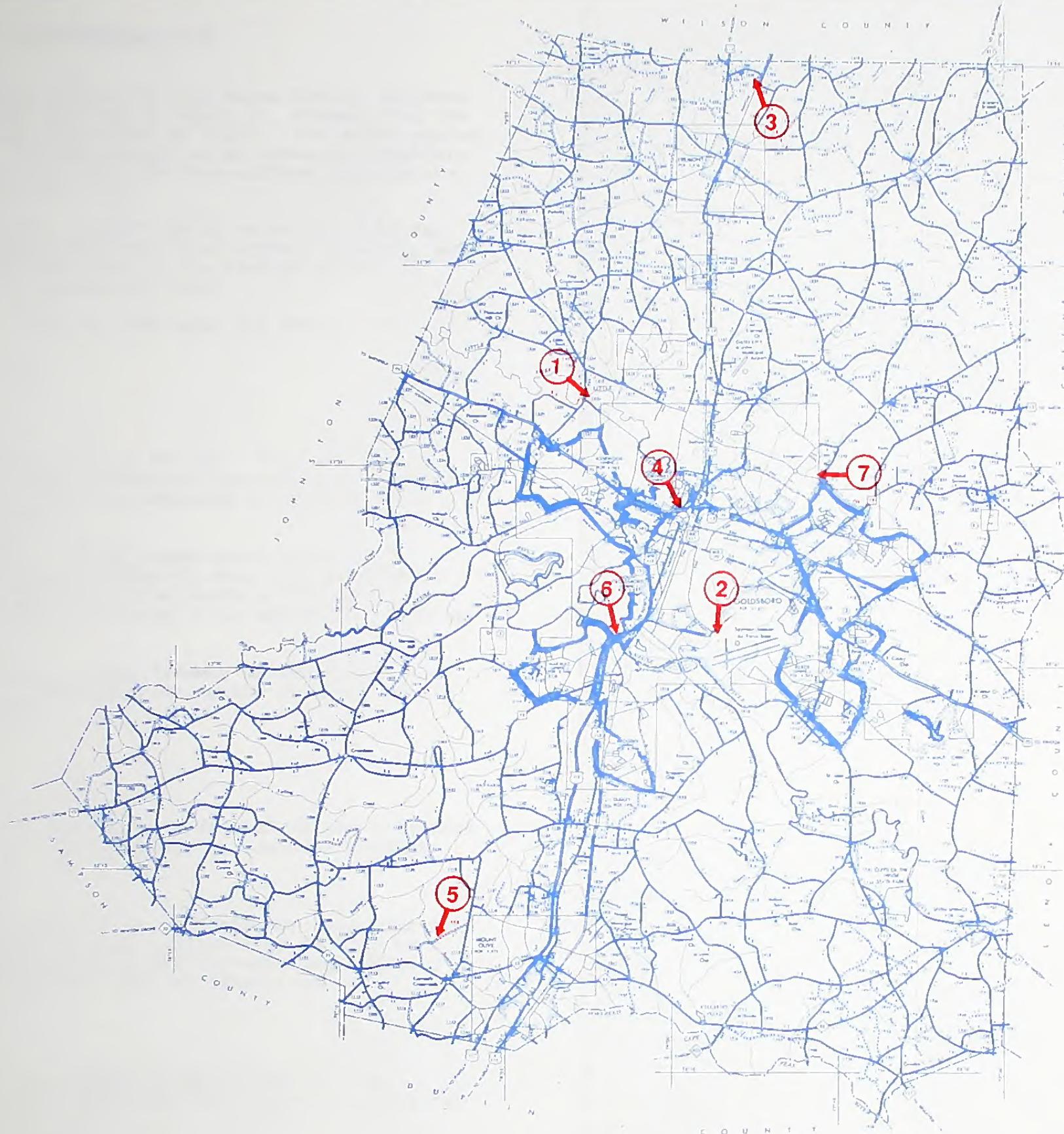
FIGURE 7

STRUCTURALLY DEFICIENT BRIDGES

LEGEND

BRIDGE LOCATIONS ← #





WAYNE COUNTY
NORTH CAROLINA

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FIGURE 8

**FUNCTIONALLY OBSOLETE
BRIDGES**

LEGEND

BRIDGE LOCATIONS ← #

SCALE
0 1 2 3 4 5 6 7 8 9 10 miles



V. THOROUGHFARE PLAN

The recommended thoroughfare plan for Wayne County is shown in Figure 9 and detailed in Appendix A, Table 1. Elements of the plan are initially classified as urban or rural. The areas around Goldsboro and Mount Olive are delineated as an urban thoroughfare planning area since a mutually approved thoroughfare plan exists between NCDOT and the municipalities.

Only **major** thoroughfares classified as to either existing or proposed, are shown within the urban thoroughfare planning area in Figure 9. This was necessary due to the limited amount of detail that can be shown on the county level.

Elements of the Wayne County Plan area are as follows:

Principal Arterials

1. US 70 - From Johnston County to NC 581. This section of this facility is projected to exceed its practical capacity by the year 2015, and it is recommended to be widened to a six lane divided facility.
2. US 117 (South) - From NC 55 in Mount Olive north to approximately the Goldsboro Planning area this section is identified as a future need in the State's 1995-2001 Transportation Improvement Program to be upgraded to freeway standards.
3. Proposed US 117 (North) - A new freeway is scheduled to begin construction in 1996 paralleling the existing US 117 from Wilson to Goldsboro.

Minor Arterials

1. US 13 - From Sampson County east to SR 1127 at the Goldsboro Planning Area Boundary. The capacity is adequate through the design year.
2. US 117 (North) - From SR 1321 at the Goldsboro Planning Area to Wilson County. The two lane section from SR 1321 to E. Ham Street in Pikeville will exceed its existing capacity even with the construction of US 117 relocation.

Major Collector Roads

1. US 117-A - From the Mount Olive Planning Area to the Goldsboro Planning Area. Existing capacity is adequate for projected traffic.

4. NC 55 - From Lenoir County to Sampson County, minus the section in the Mount Olive Planning Area. The section from NC 111 to SR 1937 does not meet the minimum tolerable lane width for safety and should be widened to 22 feet.
5. NC 111 - From Duplin County to NC 222, minus the section in the Goldsboro Planning Area. The section from SR 1545 to NC 222 should be widened to 22 feet for safety reasons.
6. NC 222 - From Johnston County to Wilson County. There are two sections that do not meet minimum tolerable lane width requirements, from Johnston County to SR 1343 and from SR 1538 to Wilson County. These sections should be widened to 22 feet for safety. Traffic improvements are recommended at the intersection of NC 222 (Main St.) and US 117 to provide for continuity and safety. A vertical adjustment or realignment for the railroad should also be considered to improve safety.
7. NC 403 - From NC 55 to Duplin County. The entire facility does not meet minimum lane width requirements and should be widened to 22 feet for safety reasons.
8. NC 581 - From SR 1317 to Wilson County. This facility seems to carry a high percentage of tandem truck traffic, therefore it is necessary to maintain a minimum pavement width of 22 feet to promote safety. The section from NC 222 to Wilson County should be widened from 20 feet to 22 feet.
9. SR 1002 (Pikeville-Princeton Rd.) - From Johnston County to the Eastern City Limits of Pikeville. The section from Johnston County to Old US 117 should be widened to 22 feet.
10. SR 1007 (Old Smithfield Road) - From Johnston County to Beaverdam Creek. This facility does not meet minimum tolerable lane width requirements and should be widened to 22 feet.
11. SR 1008 (Stevens Mill Rd.) - From SR 1223 to Johnston County. The entire facility does not meet minimum lane width requirements and should be widened to 22 feet for safety reasons.
12. SR 1745 - (Pineview Cemetery Rd.) - From SR 1915 to NC 55. This facility should be widened from 18 feet to 22 feet to meet our minimum tolerable lane width requirements.
13. SR 1915 - (Arrington Bridge Rd.) - From SR 1932 to SR 1745. The section from SR 1914 to SR 1745 should be widened to 22 feet to promote safety.

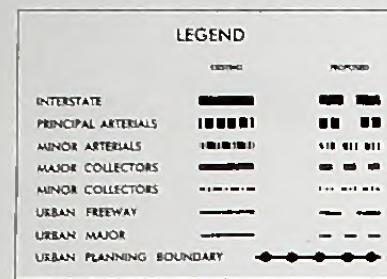
Minor Collector Roads

1. SR 1006 (Falling Creek Church Rd.) - From SR 1111 to SR 1219. This facility seems to carry a high percentage of tandem trucks, therefore it is necessary to maintain a higher minimum tolerable lane width. To improve safety, all sections of this facility should be widened to 22 feet.

2. SR 1009 (Jordans Chapel Rd.) - From Sampson County to Johnston County.
3. SR 1058 (Faro Rd.) - From Greene County to NC 222. The entire facility does not meet minimum lane width requirements and should be widened to 22 feet for safety reasons.
4. SR 1105 (Dobbersville Rd.) - From Sampson County to SR 1200 in Johnston County. This facility does not meet the minimum tolerable lane width requirements and should be widened to 22 feet.
5. SR 1111 (Suttontown Rd.) - From Sampson County to SR 1006.
6. SR 1117 (Thunder Swamp Rd.) - From Duplin County to NC 55. This facility does not meet minimum lane width requirements and should be widened to 22 feet for safety reasons.
7. SR 1120 (Oberry Rd.) - From SR 1006 to SR 1932. The section from SR 1006 to US 117 should be widened to 22 feet for safety reasons.
8. SR 1147 (Old Smith Chapel Road) - From SR 1117 to SR 1142 at Mount Olive Planning Area. This facility does not meet the minimum lane width requirements and should be widened to 22 feet.
9. SR 1219 (Old Grantham Rd.) - From SR 1006 to SR 1223. This facility does not meet the minimum lane width requirements and should be widened to 22 feet.
10. SR 1367 (Upper Black Creek Church Road) - From NC 581 to Wilson County. This facility does not meet the minimum lane width requirements and should be widened to 22 feet.
11. SR 1506 (Black Creek Road) - From NC 222 to Wilson County. This facility does not meet the minimum lane width requirements and should be widened to 22 feet.
12. SR 1534 (Big Daddy's Rd.) - From SR 1058 to Old US 117. This facility should be widened to 22 feet to improve safety.
13. SR 1731 (Piney Grove Rd.) - From SR 1730 to NC 55. The section from SR 1719 to SR 1737 should be widened to 22 feet to promote safety.
14. SR 1739 (Spring Street) - From NC 55 in Seven Springs to Duplin County. This facility does not meet the minimum lane width requirements and should be widened to 22 feet.
15. SR 1744 (Indian Springs Rd.) - From NC 55 to SR 1941. The entire facility does not meet the minimum tolerable lane width requirements and should be widened to 22 feet for safety reasons.
16. SR 1926 (Old Mt. Olive Rd.) - From SR 1120 to SR 1927.

17. SR 1932 (Emmaus Church Rd.) - From SR 1120 to SR 1927. The entire facility does not meet the minimum tolerable lane width requirements and should be widened to 22 feet for safety reasons.
18. SR 1938 (Old Mt. Olive Rd.) - From SR 1941 to SR 1120. The section from SR 1941 to SR 1979 should be widened to 22 feet to promote safety.
19. SR 1941 (Northeast Church Rd.) - From SR 1744 to NC 55. This facility should be widened to 22 feet to promote safety and meet the lane width requirements.

THOROUGHFARE PLAN FOR WAYNE COUNTY



ADOPTED BY WAYNE COUNTY 4-4-95
STATWIDE PLANNING 4-18-95
ADOPTED BY THE DEPARTMENT OF TRANSPORTATION 5-5-95

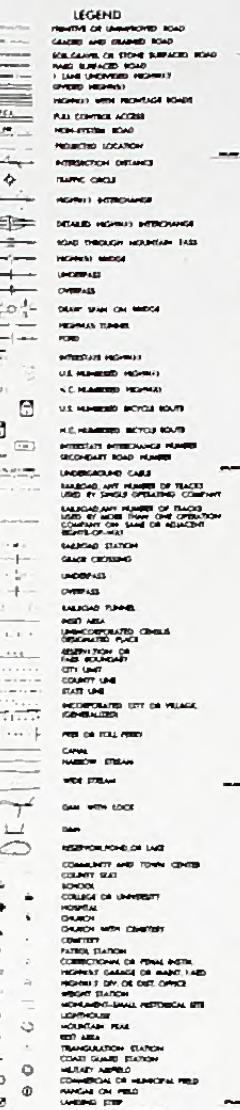
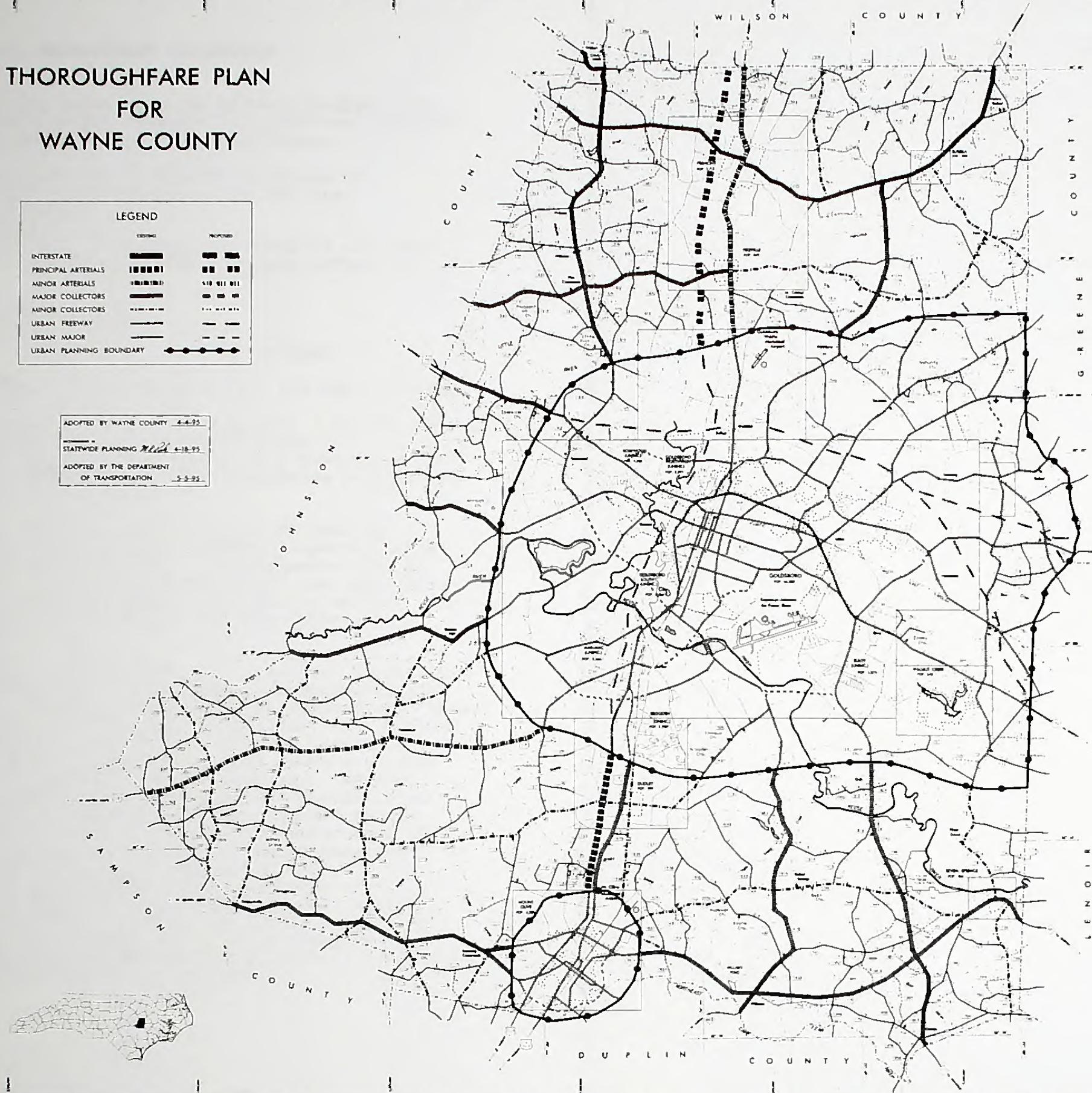


FIGURE 9

WAYNE COUNTY
NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - GIS UNIT
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE FOR PLANNING

MAP 1 OF 1



VI. IMPROVEMENT PRIORITIES

An evaluation of the North Carolina highway program from administrative, historical, and financial perspectives indicates the following objectives are of greatest importance:

- To improve the North Carolina arterial system to reduce travel costs and improve travel service between urban centers.
- To improve the level of service and safety of all roads and highways on the State system in a cost effective manner.
- To encourage economic growth.
- To preserve the natural and human environment.
- To allocate funds to projects in a fair and equitable way.

(1) User benefits, (2) cost, (3) probability that a project will stimulate economic development, (4) quantification of environmental impacts, and (5) relationship of a project to the State arterial system provide a basis for evaluating projects as to how well they meet the objectives.

User benefits include cost savings resulting from an improvement project through reduction in vehicle operating costs, travel time costs, and accident costs. The estimated through travel served by a project provides a measure of the importance of a project to the State arterial system. Heavier volumes of through traffic are generally found on the more important facilities.

Estimation of environmental impacts of a project is one of the more difficult evaluations. Environmental factors usually considered in highway project evaluation can be divided into three major categories--physical, social and/or cultural, and economic environmental considerations (Table 11). Many of these are accounted for when a project is evaluated with respect to user benefits, cost, and economic development potential. However, certain environmental factors are generally not considered in the previously mentioned evaluations but are included in the environmental impact probability. They are the environmental impacts of a project on (1) air quality, (2) water resources, (3) soils and geology, (4) wildlife, (5) vegetation, (6) neighborhoods, (7) noise, (8) educational facilities, (9) churches, (10) park and recreational facilities, (11) historic sites and landmarks, (12) public health and safety, and (13) aesthetics. The summation of both positive and negative impact probabilities with respect to these factors provides a measure of the relative environmental impact of a project.

TABLE 11

Environmental Considerations		
Physical Environment	Social and/or Cultural Environment	Economic Environment
Air quality	Housing	Businesses
Water Resources	Neighborhoods	Employment
Soils and Geology	Noise	Economic Development
Wildlife	Education Facilities	Public Utilities
Vegetation	Churches	Transportation Costs
	Park and Recreational Facilities	Capital Costs
	Public Health and Safety	Operation and Maintenance Costs
	National Defense	
	Aesthetics	

The evaluation of the proposed Wayne County projects with respect to user benefits, estimated costs, probability that economic development will be stimulated, environmental impact, and through travel service is given in Table 12.

Recommended Priorities

Recommended priorities for construction and the estimated costs (in 1990 dollars) are shown in Table 13. The recommended priorities are based on needs, anticipated future traffic volumes, and the technical data developed in this report.

Since conditions are constantly changing with time, these priorities should be reevaluated periodically by the County and the Department of Transportation.

Other desirable improvements are the upgrading of the County's unpaved and narrow collectors. Although adequate from a capacity standpoint, the poor operational characteristics of these facilities will make improvements desirable to enhance their safety and functional design.

TABLE 12

Benefits Evaluation of Wayne County Projects						
Project Description	User Benefits (\$1000)	Cost (\$1000)	Economic Development Potential Probability	Environmental Impact Probability	Through Traffic ADT*	2015
1. US 70, Johnston Co. to NC 581 (4.52 Mi)	222,700	C* 9,300 R* 700	.13	+.30 -.30	26,500	
2. US 117 N. Existing SR1321 to Ham St in Pikeville (1.68 Mi)	27	C 2,100 R 0	.13	+.30 -.30	800	

* C - Construction
 R - Right-of-Way
 ADT - Average Daily Traffic

TABLE 13

Improvement Priorities and Cost Estimates				
Route and Section	Recommended Cross Section	Construction (\$1000)	ROW (\$1000)	Total (\$1000)
1 US 117 N. Existing SR1321 to Ham St in Pikeville (1.68 Mi)	*I	2,100	0	2,100
2. US 70, Johnston Co. to NC 581 (4.52 Mi)	* 6LD	9,300	700	10,000

* See Typical Sections in Appendix A
 * 6LD - 6 Lane Divided (Rural)



VII. IMPLEMENTATION

There are several tools which are available for use by a county to assist in the implementation of a Thoroughfare Plan. They are as follows:

State-County Adoption of Thoroughfare Plan

If requested, the Department of Transportation, together with a county, will cooperatively develop and mutually approve a County Thoroughfare Plan. The mutually approved plan would serve as a guide to the Department of Transportation in the development of the road and highway system of the County. The approval of the plan by the County will enable standard road regulations and land use controls to be used effectively to assist in the implementation of the plan.

Plan development and official adoption should include a public participation element and public hearing to ensure the public is fully knowledgeable of the plan, and their comments have been adequately considered.

Future Street Lines

Future streets can be designated by a future street line. Certain requirements are necessary for a future street line ordinance. These requirements include: enabling legislation, detailed description or survey, public hearing, administrative procedure and staff to oversee the process.

The best use of this implementation tool is along existing thoroughfares that will need to be widened in the future. Using future street lines can significantly reduce the right-of-way costs over a long period of time, reduce disruption to existing development, and notify the property owners of the expectations of future planning.

Subdivision Controls

The subdivision regulations require every subdivider to submit to the County Planning Commission a plan of the proposed subdivision and requires that the subdivision be constructed to certain standards. Through this process, it is possible to require the subdivision streets to conform to the thoroughfare plan and to reserve or protect necessary rights-of-way for projected roads and highways that are to become a part of the thoroughfare plan. The construction of subdivision streets to adequate standards would reduce maintenance costs and will facilitate the transfer of the streets to the State Highway System. Appendix B outlines the recommended design standards.

Zoning Ordinance

The zoning ordinance is beneficial to thoroughfare planning in that planned locations of various land uses and their densities can be realized. This provides a degree of stability on which to forecast travel and to plan future streets. Other benefits include: the establishment of standards of development which will aid traffic operation on major thoroughfares, minimization of strip commercial development which creates traffic friction and increases the traffic accident potential, the requirement for off-street parking by new development with the purpose of eventual prohibition of all curb parking on major thoroughfares.

Land Use Controls

Land use regulations are an important tool in that they regulate future land development and minimize undesirable development along roads and highways. The land use regulatory system can improve highway safety by requiring sufficient building setbacks to provide for adequate sight distances and by requiring off-street parking.

Planned Unit Development Ordinance

Planned unit development ordinances (PUD) permit flexibility in design of larger developments, with the overall design subject to review. This ordinance can require right-of-way dedication and thoroughfare construction in accordance with the thoroughfare plan. Certain revisions may be necessary to the thoroughfare plan in order to coordinate with the development.

Functional Designs

The term "functional design" is used to describe preliminary design work done to answer questions on construction feasibility, to provide better information on right-of-way and construction cost estimates, and to give the administrative agency, developers and property owners a detailed knowledge on proposed alignments. Typically, functional designs are done on topographic mapping with a horizontal scale of 1" = 200' with 5' contours. The centerline, horizontal curves, and approximate right-of-way limits are shown. If topographic mapping is not available, functional designs are done on aerial photography or planimetric mapping.

Functional designs are expensive and time consuming and can become outdated quickly due to minor changes and adjustments. For this reason, they should all be done on an "as needed" basis.

Dedication of Right-of-Way with Density or Development Rights Transfer

North Carolina General Statutes have been amended to provide this additional tool for plan implementation. The statutes provide that a city or county may require an applicant for subdivision approval (or any other applicant for permission pursuant to a land use control ordinance) to dedicate the right-of-way within a corridor for street or highway purposes. The city or county upon dedication allows the applicant to transfer density credits, attributable to the dedicated right-of-way, to the contiguous land owned by the applicant.

If the city or county does not require dedication of right-of-way under this section or other legal authority, but an applicant elects to dedicate the needed right-of-way, the city or county may allow the applicant to transfer the density credits, attributable to the dedicated right-of-way, to contiguous land that is part of a common development plan or to transfer severable development rights to noncontiguous land in designated receiving districts.

Development Reviews

Driveway access to a State-maintained street or highway is reviewed by the District Engineer's office and by the Traffic Engineering Branch of the North Carolina Department of Transportation. In addition, any development expected to generate large volumes of traffic (e.g., shopping centers, fast food restaurants, or large industries) may be comprehensively studied by staff from the Traffic Engineering Branch, Planning and Environmental Branch, and/or Roadway Design Unit of NCDOT. If done at an early stage, it is often possible to significantly improve the development's accessibility while preserving the integrity of the thoroughfare plan. Since the County is the first point of contact for developers, it is important that the County advise developers of this review requirement and cooperate in the review process.

Funding

The majority of improvements to the State highway system are scheduled and funded by the Transportation Improvement Program. The Board of Transportation regularly conducts public meetings to obtain input from the public pertaining to their needs for highway improvements.

However, not all roadway improvements are covered by this procedure. Nearly all secondary road work is done on a county by county basis. These funds, known as the county construction account, are used to pave unimproved roads, widen roadways, stabilize dirt roads, make minor alignment improvements, and even

construct short connectors when appropriate. The Wayne County Commissioners are encouraged to work with the NCDOT Division Engineer when the County's priority list is developed. Many of the minor improvements recommended may be realized by using the County's construction account funds and developing the County's priority list in conjunction with the Division Engineer.

Other Funding Sources

- (1) Continue to work with NCDOT to have local projects included in the Transportation Improvement Program (TIP).
- (2) Lobby for the use of Discretionary Funds, which are funds that the Board of Transportation member may use at his or her discretion for area road projects.
- (3) Request Industrial Access Funds, which are state funds for the construction of access roads to large industries.

APPENDIX A



Appendix A

TYPICAL THOROUGHFARE CROSS SECTIONS

Cross section requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfares are not practical. Each street section must be individually analyzed and its cross section requirements determined on the basis of amount and type of projected traffic, existing capacity, desired level of service, and available right-of-way.

Typical cross section recommendations are shown in Figure A-1. These cross sections are typical for facilities on new location and where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels of service, and available right-of-way. The recommended typical cross sections for the thoroughfares are given in Appendix A along with other pertinent information.

On all existing and proposed major thoroughfares delineated on the thoroughfare plan, adequate right-of-way should be protected or acquired for the ultimate cross sections.

Ultimate desirable cross sections for each of the thoroughfares are listed in Appendix A. Recommendations for "ultimate" cross sections are provided for (1) thoroughfares which may require widening after the current planning period; (2) for thoroughfares which are borderline adequate and accelerated traffic growth could render them deficient; and (3) for thoroughfares where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment.

Recommended design standards relating to maximum and minimum grades, minimum sight distances, maximum degree of curve and related super elevation, and other considerations for thoroughfares are given in Appendix B. This Appendix gives definitions and design standards recommended for inclusion in subdivision regulations.

Cross sections "A" and "L" is typical for controlled access freeways. The 14 m (46 ft) grassed median is the minimum desirable median width, but there could be some variation from this depending upon design considerations. Right-of-way requirements would typically vary upward from 70 m (228 ft) depending upon cut and fill requirements.

Cross section "B", seven lane urban, should not be used for new projects. When the conditions warrant six lanes, cross section "D" should be recommended. Cross section "B" should be used only in special situations such as when widening from a five lane section and right-of-way is limited. Even in these situations, consideration should be given to converting the center turn lane to a median so that cross section "B" is the final cross section.

Cross section "C", five lane urban, is typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "D", "E", and "M" are used on major thoroughfares where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections. The 4.8 m (16 ft) median is the minimum recommended for an urban boulevard type cross section. In most instances, monolithic construction should be utilized due to greater cost effectiveness, ease and speed of placement, and reduced future maintenance requirements. In special cases, grassed or landscaped medians may be used in urban areas. However, these types of medians result in greatly increased maintenance costs and an increased danger to maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

Cross section "F" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 7.3 m (24 ft) is recommended with 9.1 m (30 ft) being desirable.

Typical cross section "G" is recommended for major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections. This cross section should be used only if the above criteria is met. If right-of-way is not restricted, future strip development could take place and the inner lanes could become de facto left turn lanes.

In urban environments, thoroughfares which are proposed to function as one-way traffic carriers would typically require **cross section "H"**. **Cross sections "I" and "J"** are usually recommended for urban minor thoroughfares since these facilities usually serve both land service and traffic service functions. **Cross section "I"** would be used on those minor thoroughfares where parking on both sides is needed as a result of more intense development.

Cross section "K" is used in rural areas or for staged construction of a wider multi-lane cross section.

On some thoroughfares, projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time. For areas that are growing and future widening will be necessary, the full right-of-way of 30 m (100 ft) should be required. In some instances, local ordinances may not allow the full 30 m (100 ft). In those cases, 21 m (70 ft) should be preserved with the understanding that the full 30 m (100 ft) will be preserved by use of building setbacks and future street line ordinances.

The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk farther away from the street to provide additional separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

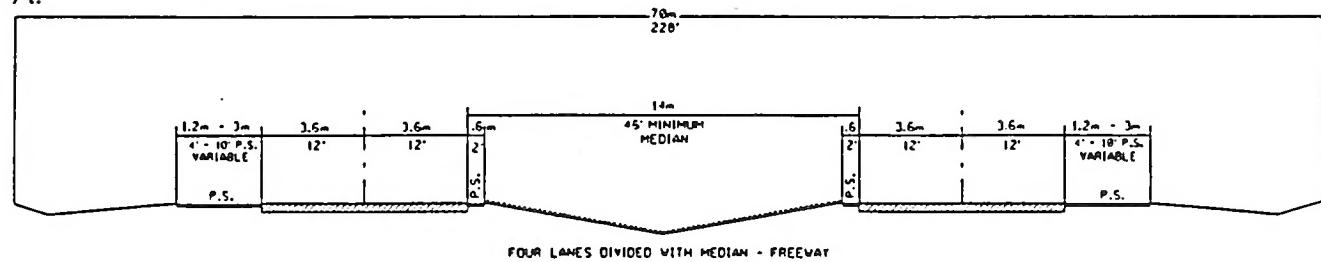
The right-of-ways shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle travel along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to contain the bicycle facilities. The North Carolina Bicycle Facilities Planning and Design Guidelines should be consulted for design standards for bicycle facilities. **Cross sections N, O, and P** are typically used to accommodate bicycle travel.

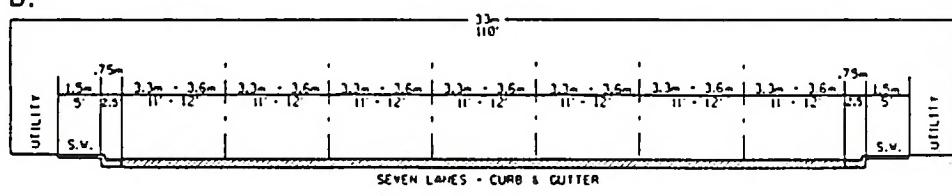


TYPICAL THOROUGHFARE CROSS SECTIONS

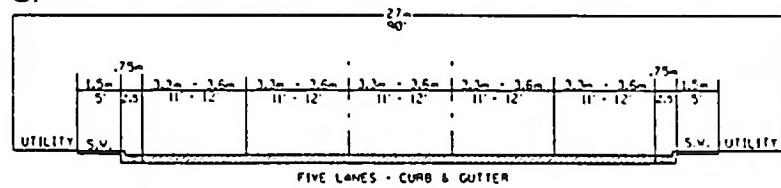
A.



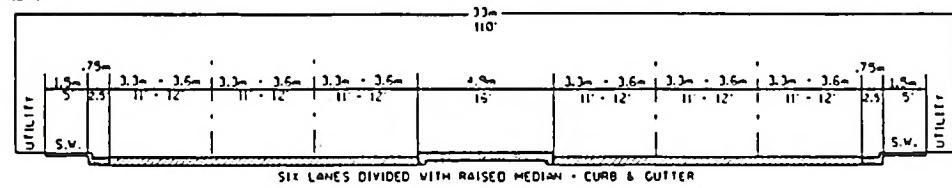
B.



C.

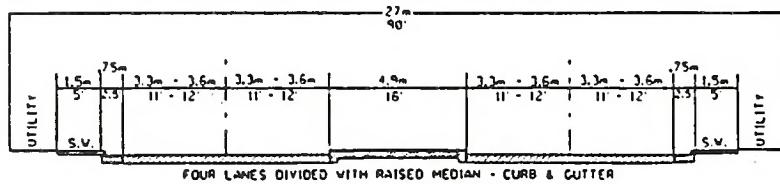


D.

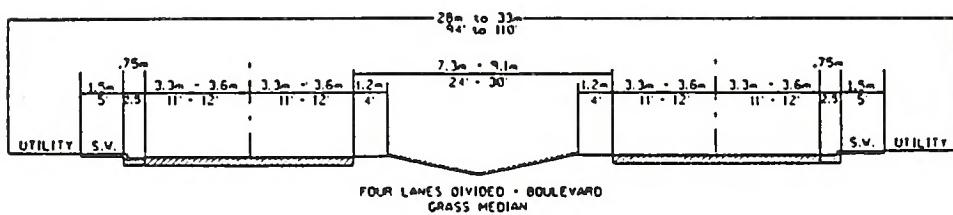


TYPICAL THOROUGHFARE CROSS SECTIONS

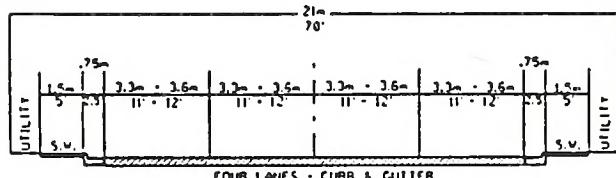
E.



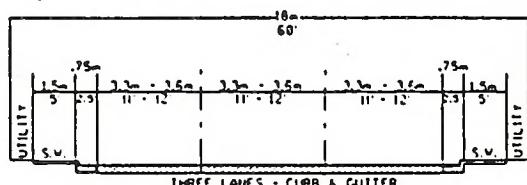
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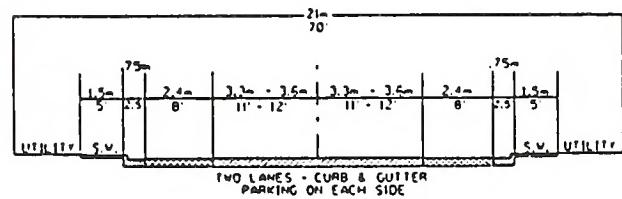
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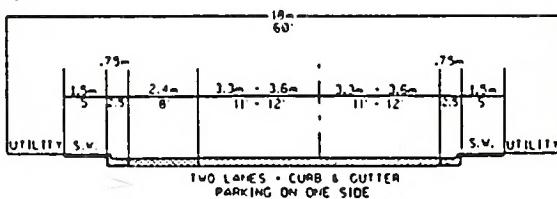
H.



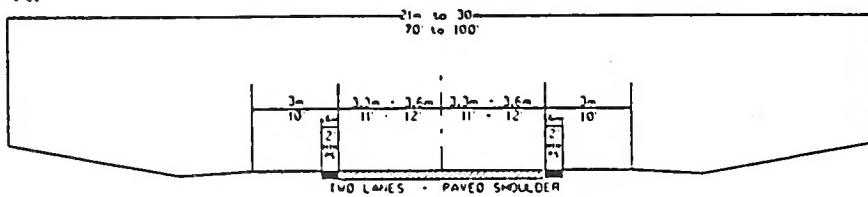
I.



J.

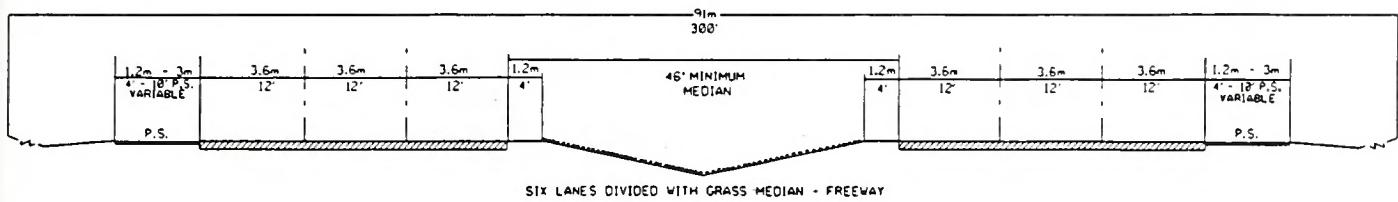


K.

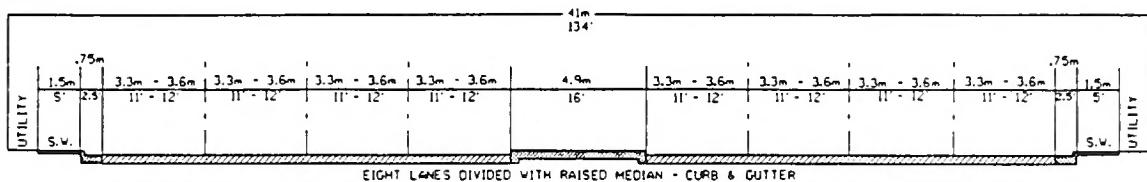


TYPICAL THOROUGHFARE CROSS SECTIONS

L.

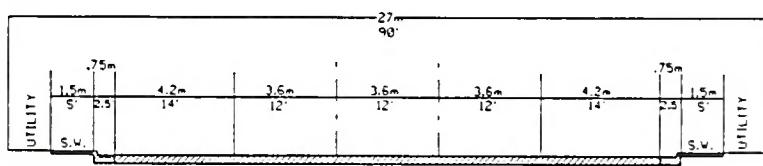


M.

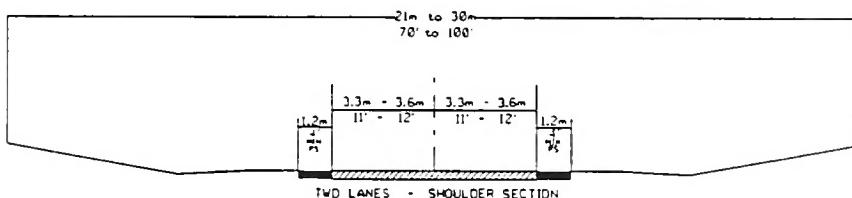


TYPICAL THOROUGHFARE CROSS SECTIONS FOR ACCOMMODATING BICYCLES

N.



O.



P.

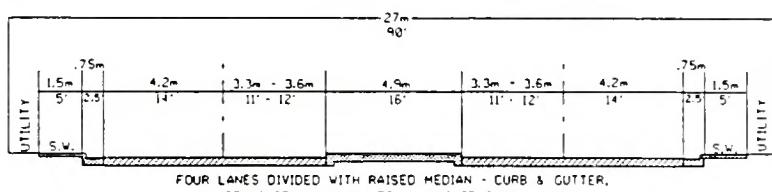




TABLE A1
WAYNE COUNTY
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

The Street Tabulation and Recommendations on the following pages consist of a listing of roads in the County, base year and future year traffic volumes, and recommended cross sections for each facility.

Key to abbreviations:

6LD.....	Six lanes divided
A through L	Refer to thoroughfare cross sections, Figure A-1
ADQ	Adequate existing situation
ADT	Average Daily Traffic, measured in vehicles per day
CAPACITY	Volume of traffic a roadway can handle at Level of Service D
DIST	Distance along section of roadway, measured in miles
E, N, S, W	East, north, south, or west
ECL, NCL, SCL, WCL	Eastern, northern, southern, or western city limits
FT	Feet
KM	Kilometers (1.609 KM = 1 mile)
MI	Miles
N/A	Not available
RDWY	Roadway width, measured in feet
ROW	Right-of-way width, measured in feet
SR	Secondary road number -
VPD	Vehicles per day



APPENDIX A TABLE 1
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

* FACILITY & SECTION	* EXISTING			* PRACTICAL *			* RECOMMENDED *		
	* X - SECTION			* CAPACITY *			* X - SECTION *		
	* DIST	* RDWY	* ROW	* CURRENT	* 1990	* 2015	* RDWAY	* ROW	* (ULT)
* MI	* FT	* FT	(FUTURE)	ADTS	ADTS	(ULT)	(ULT)		
* US 13									*
SAMPSON CO-SR 1127	12.0	24	60	7100	2600	4200	ADQ	ADQ	*
* US 70									*
JOHNSTON CO.-NC 581	4.52	46	160	30000	14800	53000	6LD*	ADQ	*
** 6 LANE DIVIDED-RURAL									*
* US 117 (SOUTH)									*
NC 55-US 117-A	7.70	56	200	30000	7900	13000	ADQ	ADQ	*
* US 117-A (SOUTH)									*
NC 55-US 117	7.80	24	100	11300	3800	7000	ADQ	ADQ	*
* EXISTING US 117 (NORTH)									*
SR 1321-E. HAM ST.	1.68	28	100	8500	8300	9000	I	ADQ	*
E. HAM ST.-NCL PIKEVILLE	0.44	48	100	20000	8300	7000	ADQ	ADQ	*
NCL PIKEVILLE-WILSON CO.	6.03	24	100	7500	7300	4600	ADQ	ADQ	*
* PROPOSED US 117 (NORTH)									*
SR 1321- WILSON CO	8.50	56	300	(30000)	----	10000	A	300	*
* NC 55									*
LENOIR CO.-NC 111	3.70	24	100	11300	2000	2800	ADQ	ADQ	*
NC 111-SR 1937	8.20	20	100	9300	2200	4600	22'	ADQ	*
SR 1937-SR 1969	1.33	22	100	10400	2200	4600	ADQ	ADQ	*
SR 1969-SR 1113	6.70	24	150	11300	2600	5500	ADQ	ADQ	*
SR 1113-SAMPSON CO.	5.40	24	150	11300	2000	3700	ADQ	ADQ	*
* NC 111									*
DUPLIN CO.-NC 55	2.70	24	60	11300	2500	5200	ADQ	ADQ	*
NC 55-SR 1726	6.77	24	60	11300	2900	5300	ADQ	ADQ	*
SR 1545-NC 222	7.20	20	60	9300	1200	2500	22'	ADQ	*

APPENDIX A TABLE 1 (CONTINUED)
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

* FACILITY & SECTION	* EXISTING	*PRACTICAL*		* 1990 *	* 2015 *	* RDWAY *	* ROW *	* RECOMMENDED *
	* X - SECTION	*CAPACITY*	* X - SECTION *					
	* DIST	* RDWY	* ROW					
	* MI	* FT	* (FUTURE)	ADTS	ADTS	(ULT)	(ULT)	*
* NC 222								*
* JOHNSTON CO.-SR 1343	2.80	20	60	9300	1500	3200	22'	ADQ *
* SR 1343-NEW US 117	2.63	24	60	11300	1500	3800	ADQ	ADQ *
* US 117-US 117A	0.80	24	60	11300	1500	6000	ADQ	ADQ *
* US117A-VANCE ST.	0.29	40	60	16000	1500	3200	ADQ	ADQ *
* VANCE ST.-SR 1538	0.18	30	60	12000	1100	2400	ADQ	ADQ *
* SR 1538-WILSON CO.	9.53	20	60	9300	1300	3000	22'	ADQ *
* NC 403								*
* NC 55-DUPLIN CO.	0.60	18	60	7600	1000	1900	22'	ADQ *
* NC 581								*
* SR 1317-SR 1002	1.90	24	60	11300	3500	7300	ADQ	ADQ *
* SR 1002-SR 1337	2.40	24	60	11300	3000	4900	ADQ	ADQ *
* SR 1337-NC 222	2.80	22	60	10400	2000	3600	ADQ	ADQ *
* NC 222-WILSON CO.	3.05	20	60	9300	1200	2000	22'	ADQ *
* SR 1002(PKVLLE-PRNCTN RD)								*
* JOHNSTON CO.-NC 581	3.60	18	60	7600	800	2000	22'	ADQ *
* NC 581-SR 1321	3.50	18	60	7600	1700	4000	24	ADQ *
* SR 1321-OLD US 117	0.84	20	60	9300	3000	7000	24'	ADQ *
* US 117-ECL PIKEVILLE	0.27	36	60	15000	2500	4500	ADQ	ADQ *
* SR 1006 (FALLING CR CH RD)								*
* DUPLIN COUNTY-SR 1219	8.90	18	60	7600	300	500	22'	ADQ *
* SR 1007(OLD SMITHFIELD RD)								*
* JOHNSTON CO.-BEAVERDAM CR	3.50	20	60	9300	1500	3000	22'	ADQ *

APPENDIX A TABLE 1 (CONTINUED)
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

APPENDIX A TABLE 1 (CONTINUED)
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

APPENDIX A TABLE 1 (CONTINUED)
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

*	* EXISTING	* PRACTICAL*	*	* RECOMMENDED *
*	* X - SECTION	* CAPACITY*	*	* X - SECTION *
*	FACILITY & SECTION	* DIST * RDWY * ROW * CURRENT	1990	2015 * RDWAY * ROW *
*	* MI * FT * FT * (FUTURE)	* ADTS * ADTS * (ULT) * (ULT)		
*				
* SR 1938 (OLD MT. OLIVE RD)				
* SR 1941-SR 1979	3.54	18 60	7600	1500 2700 22' ADQ *
* SR 1979-SR 1120	0.90	22 60	10400	1500 2700 ADQ ADQ *
*				
* SR 1941 (NE CHURCH RD)				
* SR 1744-NC 55	1.28	18 60	7600	1600 3000 22' ADQ *
*				

APPENDIX B

Appendix B

RECOMMENDED SUBDIVISION ORDINANCES

Note: English equivalents are printed in this report merely as a guide. The English measurements were not meant to represent exact conversions, and should not be used for standards, regulations, or construction. The tables in this section were taken from the Roadway Design Metric Design Manual. In the event of conflicting information, the Standard Specifications for Roads and Structures and the Roadway Design Metric Design Manual should serve as the standard.

Appendix B

RECOMMENDED SUBDIVISION ORDINANCES

DEFINITIONS

I. Streets and Roads

A. Rural Roads

1. **Principal Arterial** - A rural link in a highway system serving travel, and having characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.
2. **Minor Arterial** - A rural roadway joining cities and larger towns and providing intra-state and inter-county service at relatively high overall travel speeds with minimum interference to through movement.
3. **Major Collector** - A road which serves major intra-county travel corridors and traffic generators and provides access to the Arterial system.
4. **Minor Collector** - A road which provides service to small local communities and traffic generators and provides access to the Major Collector system.
5. **Local Road** - A road which serves primarily to provide access to adjacent land, over relatively short distances.

B. Urban Streets

1. **Major Thoroughfares** - Major thoroughfares consist of Inter-state, other freeway, expressway, or parkway roads, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.
2. **Minor Thoroughfares** - Minor thoroughfares perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through traffic movements and may also serve abutting property.
3. **Local Street** - A local street is any street not on a higher order urban system and serves primarily to provide direct access to abutting land.

C. Specific Type Rural or Urban Streets

1. Freeway, expressway, or parkway - Divided multilane roadways designed to carry large volumes of traffic at high speeds. A freeway provides for continuous flow of vehicles with no direct access to abutting property and with access to selected crossroads only by way of interchanges. An expressway is a facility with full or partial control of access and generally with grade separations at major intersections. A parkway is for non-commercial traffic, with full or partial control of access.
2. Residential Collector Street - A local street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.
3. Local Residential Street - Cul-de-sacs, loop streets less than 760 meters (2500 ft) in length, or streets less than 1.6 kilometers (1.0 miles) in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
4. Cul-de-sac - A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.
5. Frontage Road - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.
6. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

- A. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.
- B. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.
- C. Lot - A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

III. Subdivision

- A. Subdivider - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.
- B. Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or re-combination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than 4 hectares (10 acres) where no street right-of-way dedication is involved, (3) the public acquisition, by purchase, of strips of land for the widening or the opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than 0.8 hectares (2 acres) into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.
- C. Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.
- D. Reservation - Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

DESIGN STANDARDS

I. Streets and Roads

The design of all roads within the Planning Area shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHTO) manuals.

The provision of street rights-of-way shall conform and meet the recommendations of the Thoroughfare Plan, as adopted by the municipality.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

A. Right-of-way Widths - Right-of-way (ROW) widths shall not be less than the following and shall apply except in those cases where ROW requirements have been specifically set out in the Thoroughfare Plan.

	Min. ROW
1. Rural	
a. Principle Arterial	
Freeways	105 m (350 ft)
Other	60 m (200 ft)
b. Minor Arterial	30 m (100 ft)
c. Major Collector	30 m (100 ft)
d. Minor Collector	24 m (80 ft)
e. Local Road	18 m ¹ (60 ft)
2. Urban	
a. Major Thoroughfare other than Freeway and Expressway	27 m (90 ft)
b. Minor Thoroughfare	21 m (70 ft)
c. Local Street	18 m ¹ (60 ft)
d. Cul-de-sac	Variable ²

The subdivider will only be required to dedicate a maximum of 30 meters (100 ft) of right-of-way. In cases where over 30 meters (100 ft) of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 30 meters (100 ft). On all cases in which right-of-way is sought for a fully controlled access facility, the subdivider will only be required to make a reservation. It is strongly recommended that subdivisions provide access to properties from internal streets, and that direct property access to major thoroughfares, principle and minor arterials, and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

A partial width right-of-way, not less than 18 meters (60 ft) in width, may be dedicated when

¹ The desirable minimum right-of-way (ROW) is 18 meters (60 ft). If curb and gutter is provided, 15 meters (50 ft) of ROW is adequate on local residential streets.

² The ROW dimension will depend on radius used for vehicular turn around. Distance from edge of pavement of turn around to ROW should not be less than distance from edge of pavement to ROW on street approaching turn around.

adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is sub-divided, the remainder of the full required right-of-way shall be dedicated.

B. Street Widths - Widths for street and road classifications other than local shall be as recommended by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. Local Residential

Curb and Gutter section: 7.8 meters (26 ft), face to face of curb
Shoulder section: 6.0 meters (20 ft) to edge of pavement, 1.2 meters (4 ft) for shoulders

2. Residential Collector

Curb and Gutter section: 10.2 meters (34 ft), face to face of curb
Shoulder section: 6.0 meters (20 ft) to edge of pavement, 1.8 meters (6 ft) for shoulders

C. Geometric Characteristics - The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. Design Speed - The design speed for a roadway should be a minimum of 10 km/h (5 mph) greater than the posted speed limit. The design speeds for subdivision type streets shall be:

DESIGN SPEEDS (METRIC)			
Facility Type	Desirable	Design Speed km/h Minimum Level	Rolling
RURAL			
Minor Collector Roads (ADT Over 2000)	100	80	60
Local roads including Residential Collectors and Local Residential (ADT Over 400)	80	80	60
URBAN			
Major Thoroughfares other than Freeway or Expressway	100	60	60
Minor Thoroughfares	100	50	50
Local Streets	50	50	30

DESIGN SPEEDS (ENGLISH)			
Facility Type	Desirable	Design Speed mph Minimum Level	Rolling
RURAL			
Minor Collector Roads (ADT Over 2000)	60	50	40
Local roads including Residential Collectors and Local Residential (ADT Over 400)	50	* 50	* 40
URBAN			
Major Thoroughfares other than Freeway or Expressway	60	50	40
Minor Thoroughfares	40	30	30
Local Streets	30	**30	**20

* Based on ADT of 400-750. Where roads serve a limited area and small number of units, can reduce min design speed.

**Based on projected ADT of 50-250.
(Reference NCDOT Roadway Design Manual page 1-1B)

2. Maximum and Minimum Grades

a. The maximum grades in percent shall be:

MAXIMUM VERTICAL GRADE (METRIC)				
Facility Type	Design Speed (km/h)	<u>Maximum Grade (Percent)</u>		
		Flat	Rolling	Mountainous
RURAL				
Minor Collector Roads*	30	7	10	12
	50	7	9	10
	65	7	8	10
	80	6	7	9
	100	5	6	8
	110	4	5	6
Local roads including Residential Collectors and Local Residential Streets*	30	-	11	16
	50	7	10	14
	65	7	9	12
	80	6	8	10
	100	5	6	-
URBAN				
Major Thoroughfares other than Freeway or Expressway	50	8	9	11
	65	7	8	10
	80	6	7	9
	100	5	6	8
Minor Thoroughfares*	30	9	12	14
	50	9	11	12
	65	9	10	12
	80	7	8	10
	100	6	7	9
	110	5	6	7
Local Streets*	30	-	11	16
	50	7	10	14
	65	7	9	12
	80	6	8	10
	100	5	6	-

* For streets and roads with projected annual average daily traffic less than 250 or short grades less than 150 meters (500 ft) long, grades may be 2% steeper than the values in the above table.

(Reference NCDOT Roadway Metric Design Manual page 1-12 T-3)

MAXIMUM VERTICAL GRADE (ENGLISH)

Facility Type	Design Speed (mph)	<u>Maximum Grade (Percent)</u>		
		Flat	Rolling	Mountainous
RURAL				
Minor Collector Roads*	20	7	10	12
	30	7	9	10
	40	7	8	10
	50	6	7	9
	60	5	6	8
	70	4	5	6
Local roads including Residential Collectors and Local Residential Streets*	20	-	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	-
URBAN				
Major Thoroughfares other than Freeway or Expressway	30	8	9	11
	40	7	8	10
	50	6	7	9
	60	5	6	8
Minor Thoroughfares*	20	9	12	14
	30	9	11	12
	40	9	10	12
	50	7	8	10
	60	6	7	9
	70	5	6	7
Local Streets*	20	-	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	-

b. Minimum grade should not be less than 0.5% .

c. Grades for 30 meters (100 ft) each way from intersections (measured from edge of pavement) should not exceed 5%.

* For streets and roads with projected annual average daily traffic less than 250 or short grades less than 150 meters (500 ft) long, grades may be 2% steeper than the values in the above table.

(Reference NCDOT Roadway Design Manual page 1-12 T-3)

3. Minimum Sight Distance - In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters:

SIGHT DISTANCE (METRIC)					
Design Speed (km/h)	30	50	60	90	100
Stopping Sight Distance					
Minimum (meters)	29.6	57.4	74.3	131.2	157.0
Desirable (meters)	30	70	90	170	210
Minimum K* Value for:					
Crest curve	3	9	14	43	62
Sag curve	4	11	15	30	37
Passing Sight Distance:					
Minimum Passing Dist for two lanes, in m	*	*	*	*	*

(General practice calls for vertical curves to be multiples of 10 meters. Calculated lengths shall be rounded up in each case.)

* Currently under revision.

(Reference NCDOT Roadway Metric Design Manual page 1-12 T-1)

SIGHT DISTANCE (ENGLISH)					
Design Speed, MPH	30	40	50	60	
Stopping Sight Distance:					
Minimum (ft.)	200	275	400	525	
Desirable (ft.)	200	325	475	650	
Minimum K* Value for:					
Crest Curve	30	60	110	190	
Sag Curve	40	60	90	120	
Passing Sight Distance:					
Minimum Passing Distance for 2 lanes, in feet	1,100	1,500	1,800	2,100	

(General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case.)
(Reference NCDOT Roadway Design Manual page 1-12 T-1)

* K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length of the vertical curve which will provide the desired sight distance. Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1990".

4. The "Superelevation Table" shown below shows the minimum radius and the related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter is 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

SUPERELEVATION TABLE (METRIC)		
Design Speed	Maximum e^*	Minimum Radius m
50 km/h	0.04	100
	65	175
	80	280
	100	490
50	0.06	90
	65	160
	80	250
	100	435
50	0.08	80
	65	145
	80	230
	100	395

e = rate of roadway superelevation, meter per meter

SUPERELEVATION TABLE (ENGLISH)			
Design Speed	Maximum e^*	Minimum Radius ft.	Max. Deg. of Curve
30 mph	0.04	302	19 00'
	40	573	10 00'
	50	955	6 00'
	60	1,637	3 45'
30	0.06	273	21 00'
	40	521	11 15'
	50	955	6 45
	60	1,432	4 15'
30	0.08	260	22 45'
	40	477	12 15'
	50	819	7 30'
	60	1,146	4 45'

* e = rate of roadway superelevation, foot per foot
 (Reference NCDOT Roadway Design Manual page 1-12 T-6 thru T-8)

D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty-five (65) degrees.
2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.
3. Off-set intersections are to be avoided. Intersections which cannot be aligned should be separated by a minimum length of 60 meters (200 ft) between survey center lines.

E. Cul-de-sacs

Cul-de-sacs shall not be more than 150 meters (500 ft) in length. The distance from the edge of pavement on the vehicular turn around to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turn around. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provisions are made for service access. Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.
2. The width of an alley shall be at least 6.0 meters (20 ft).
3. Dead end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn around facilities at the dead end as may be required by the Planning Board.

G. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is

available at the office of the District Engineer of the Division of Highways.

H. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 9.0 meters (30 ft) from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 1.8 meters (6 ft) from the face of curb.

I. Wheel Chair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provide wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

J. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

a. Shoulder section approach

i. Under 800 ADT design year

Minimum 8.4 meters (28 ft) width face to face of parapets, rails, or pavement width plus 3.0 meters (10 ft), whichever is greater.

ii. 800 - 2000 ADT design year

Minimum 10.2 meters (34 ft) width face to face of parapets, rails, or pavement width plus 3.6 meters (12 ft), whichever is greater.

iii. Over 2000 ADT design year

Minimum width of 12 meters (40 ft), desirable width of 13.2 meters (44 ft) width face to face of parapets or rails.

b. Curb and gutter approach

i. Under 800 ADT design year

Minimum 7.2 meters (24 ft) face to face of curbs.



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ii. Over 800 ADT design year

Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be a minimum of 450 millimeters (1' 6"), or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:
 - a. Shoulder section approach - Width of approach pavement plus width of usable shoulders on the approach left and right. (Shoulder width 2.4 m (8 ft) minimum, 3.0 m (10 ft) desirable.)
 - b. Curb and gutter approach - Width of approach pavement measured face to face of curbs.



